THE WEL SPRING OF SCIENCES:

Which teacheth the perfect vvorke and practise of Arithmeticke, both in whole Numbers and Fractions: set foorth by Humfrey Baker Londoner. 1562.

And novv once againe perused augmented, and amended in all the three parts, by the sayde Authour: whereunto he hath also added certain tables of the agreement of measures and waights of diuers places of Europe, the one with the other, as by the Table following it may appeare.

Imprinted at London by Thomas Pursoote.
1591

S

Samuel

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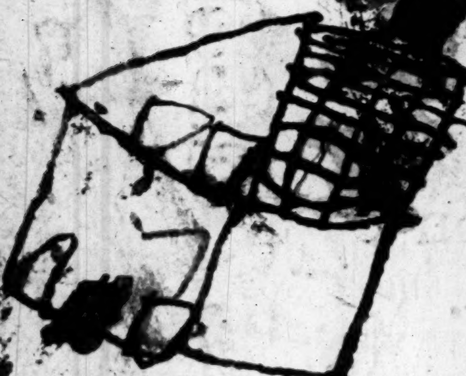
Samuel

his Book



the 19 of October

in the year

of our Lord God

1766

The prologue to the gentle Reader.

HAuing somtime now twelue yeres sithence (gentle Reader) published in print one English booke of Arithmetike, containing, as I suppose, sundrie necessarie & profitable documents for such as are willing to attaine any knowledge therin, I haue bene often since that time, and of verie late also, requested by sundrie of my friendes, to peruse the same worke, and as I should now iudge it expedient, to adde something more thereunto, and to amplifie the same. Which earnest and friendly sute of theirs, for certaine iust causes seeming needful vnto me, surely I could in no wise denie. For when I perceiued the importunitie of certaine strangers, not born within this land, at this present, and of late dayes, so farre proceeding, that they aduanced and extolled themselues in open talke and writings, that they had attained such knowledge and perfection in Arithmeticke, as no English man the like: Truely me thought that the same report, not only tended to the dispraise of our Country men in general: but touched especially some others, and mee, that had trauailed and written publikely in the same facultie. For vnto this same effect they haue of late painted the corners and posts in euery place within this Citie with their peeuish billes, making

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king promise, and bearing men in hande that they could teach the summe of that science in briefe Methode, and compendious rules, such as before their arriuall hath not beene taught within this Realme. Whose sayings to bee false, and writings vntrue, if I were thereto required by men of auctoritie, I am well able to proue, and that more is (bee it spoken without enuie, or thirst of prayse) euen within this same Booke, if it maye please thee to make tryall, are generall precepts and rules to bee founde, such, as they can bring foorth neither briefer nor better. But this is no rare thing, since in other matters of greater importance, their attempts are too too perillous, and their deedes outragious, well deseruing restraint and banishment, against one of whom, verely not of mine owne accorde, but constraynedly, I haue beene enforced to sharpen my penne, for that hee, as I heare say, continueth in dispraysе of our Nation, saying that wee are vnskilfull in those Rules that hee teacheth, and himselfe excellent in the knowledge of Arithmeticke, wherein if true tryall might bee indifferent iudge, I doubt not but hee would bee founde to haue least skill of a great manie: of whom perhaps, if I should write vpon report of others, I could say somewhat more, which would (if it were true, and he knowne) redound vnto his vtter discredit, which for this cause I omit to do, least the crime of arrogancie might be thought

to reſt within me, which I obiect againſt him, howbeit, thus much I dare affirm, that there are diuerſe in this honourable Citie, who although they aduance and extoll not themſelues (ſo malapertly) as theſe ſort of men are accuſtomed to do in all that they profeſſe, yet do farre ſurpaſſe them, aſwell in the knowledge of numbers as in all other kind of learning & skilfulnes: another cauſe alſo there is of this preſent editiō, as it ſeemeth to me very iuſt and neceſſarie: for when a certaine welwiller of mine purpoſing to imploy ſome time in bettring his knowledge in Arithmetik through the reading of this preſēt book did certifie me, that he in peruſing the ſame had eſpied ſo many errors cōmitted in the printing, that he could gather no truth thereby, I was not a litle moued therat, ſince that by the diſordring therof, neither the work retained his true meaning, neither could the learner attain his deſired knowledge: & ſurely no maruel, for as I am credibly informed, ſince it paſſed out of my hands it hath bin oftentimes printed without the view of a skilful corrector, vnto the great diſcredit of the Authour. Theſe & ſuch like conſiderations, vrging me forward, and not forgetting the fruit louing Reader, that may grow vnto thee hereby: I haue taken in hande both to amend and augment the ſame, ſeaſoning (as it were afreſh) all three partes of the worke, with diuerſe queſtions and examples, verye neceſſarie and profitable, hauing alſo for thy cōmodity added vnto

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the end of his booke diuerse and sundry tables of the agreement of measures and waights of sundrie places, reduced to an equalitie the one to the other. Vnto thee therefore my request is thankfully to accept the same, and in good part, wishing well to him that trauaileth for thy benefit, not disdaining it in respect of grosnesse of the stile, or rudenesse of vtterance, since that this science requireth not eloquence of writing, but plainnesse of teaching, and truth in working of diuerse conclusions by numbers onely, desiring thee, if thou be willing to profite hereby, first friendly to amend the faults that haue escaped in the printing of the same, and then to begin at the entrance of the booke, and so orderly proceed forward vnto the end, not turning vnto the middest or last part thereof, vntill thou perceyuest well that which went before, and so doing, thou shalt not only attaine to the perfite knowledge of the whole effect: but be able also by thine owne labour and industrie, to vnderstand all other bookes of Arithmeticke whatsoeuer: and thus I bid thee farewell heartily.

To the right Worſhipfull the Gouernour, Aſsiſtants, and the reſt of the Companie of Marchaunts aduenturers: Humfrey Baker Londoner, wiſheth health with contitual increaſe of commoditie by their worthie trauaile.

IF the knowledge of Arithmeticke, right worſhipful, were of ſo ſmal profite in the life of man, or ſo litle vſed in our worldly affairs, that it might be well left, or but ſeldom frequented, it were well done by the profeſſours thereof, to penne any long and eloquent Orations, in ſetting forth the commendation of the ſame. But ſince experience hath taught to be true the olde prouerbe: That where good wine is to ſell, there need no garland be hanged out, me thinketh they do great iniurie vnto Arithmeticke, that ſeeke to

heare the commodities thereof set fooorth in a short Epistle, and surely they ouercharge mee in laying such a burthen on my backe as were too importable for the greatest Oratour. For the skill hereof is well knowne, immediatly to haue flowed from the wisedome of God, into the heart of man, whome he hath created the chiefe image, and instrument of his praise and glorie, reuealing himselfe vnto him so farre as he iudged conuenient, whom notwithstanding hee could not conceiue to remaine in the most secrete mysterie of Trinitie in Vnitie, were it not by the benefite of moste diuine skill in numbers, which skill as also the most full and effectuall knowledge of all other things vnspeakeable, God vsed in his wonderfull Creation of all the worlde out of nothing, which he accomplished within the compasse of certaine number of dayes, expressing moreouer what he made in euery day, & of certaine his creatures how many he made, as appea-

reth

reth in the booke of Genesis, written by speciall reuelation of the holy Ghost, wherein the diuine Maiestie of God could not be knowne vnto vs without the knowledge of numbers, nor Moises haue vnderstoode what himselfe had written. And Salomon the wisest man that euer was, considered the very depth of all things within his minde, to whom God had giuen a greater gift of wisedome, then to any man either before or since, doubted not to breake foorth in these wordes, saying: Thou, O Lorde, hast disposed all thinges in measure, number and waight, for thus it pleased him to iudge, who in another place testifieth, howe that hee hath searched deeper into the causes and knowledge of all things, then any other man in the worlde.

These testimonies (right Worshipfull) doe manifestly teach vs, what wee ought to thinke of the cause, and originall of Arithmeticke, & partly also how necessarie it is in the life of man, that

vnleſſe by Nature, wee haue ſome feeling and vnderſtandinge therein, wee are no better than Beaſtes, and in this reſpect woorſe, for that wee retayne not that where-unto wee are as ſpeciallye borne, as naturallye they doe, ſome to running, ſome to ſmelling, ſome to hearing, ſome to flying, and ſome to ſwimming. Take away Arithmeticke, wherein differeth the Sheephearde from the ſheepe, or the Horſekeeper from the Aſſe? Surelye but onely in ſhape and fygure, which as the learned affirme, is a very ſlender cauſe of difference. Wherefore not without iuſt cauſe haue the auncient Fathers, and Philoſophers, ſingularlye extolled the knowledge of Arithmeticke, diligently trayning vp their youth therein, as in a ſcience moſt neceſſarie of it ſelfe, conſidering the deepe deuices, the profounde practiſes, and cunning concluſions therein contayned: and alſo that it is the Keye and enteraunce into all other artes and learning:

ning: as well approoued the Noble Philoſopher Pithagoras, who cauſed this inſcription to bee written vppon his ſchoole doore (where hee taught Philoſophie) in great letters, Nemo Arithmeticæ ignarus hic ingrediatur: Let none enter heere, that is ignoraunt in Arithmeticke: which ſaying, as it is proper and peculier vnto all ſortes of men in the beginning and entraunce into all liberall knowledge and Faculties to bee inſued and embraced, ſo ſurely aboue all other it is, next after the worde of GOD, moſt fit and neceſſarie that it ſhoulde bee written vppon your ſchoole doores, righte Worſhipfull, whoſe trade and trauaile is imployed in the noble trafficque of Marchaundiſe, wherein you haue neede of continuall recourſe vnto this excellent Arte. The daylye exerciſe whereof, hath ſo ſharpened youre judgements, and ripened youre vnderſtandings, that moſt of you are become ſingular therein, both to

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deale that waye your selues, and to iudge of other mens doeings. And herein I am sure you are good witnesses with mee, howe foolishe and vaine is there opinion, which beside your moste commendable affayres, suppose and affirme that Arithmeticke is of small vse vnto anie other men, seeing that the Lawes of sundrie Realmes well instituted and guided, haue deseruedly accounted for fooles, and vnfit members, (to rule or deale in a common wealth,) all such as wanted the skill of naturall Arithmeticke, depriued them both of Landes and liuing, which as it tendeth vnto no small prayse and credite of Arithmeticke, so I am constrained for briuitie sake, in fewe wordes to ouerpasse both that and others, which might bee sayde in commendation thereof. Shortly admonishing your worshippes, that whereas in times past as is well knowne, I had trauailed in a booke in Englishe of that facultie,

dedica-

dedicated vnto you: beeing nowe enforced to runne ouer the ſame, both amending and augmenting it with ſundrye Additions: I am ſo bolde againe to attempte youre Worſhippes with the acceptation thereof, hoping that as in fore time yee haue taken it ſuch as it was, yee will nowe alſo daigne to receyue it, beeing in better caſe (I hope) then euer it was, a token of my good will, howe bee it a ſimple thing, wherein you maye weigh the heart and not the gift, proceeding from ſuch a Fountaine, that if better skill and knowledge had beene matched to my good meaning, it ſhoulde haue beene doone otherwiſe, to the better contentation of your woorthineſſe. And therefore in the meane ſeaſon, vntill it pleaſe GOD to finiſhe mee in ſuch ſorte, I reſt in daylye prayer vnto him, to maineтaine your fellowſhip in happie eſtate and to bleſſe your purpoſes with luckie ſucceſſe, to guide your voiages with wiſhed

wished increase, and to season your doings with all kinde of vertue, and to preserue your liues with desired health to his will and pleasure.

At London the 2. day of September. 1580.

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The Dyffinition of Number.

NUMBER IS AS much to say as a multitude compounde of many vnities, as two is compounded of two vnities, three is compounded of three vnities, foure of foure vnities, fiue of fiue vnities, ten of ten, fourteene of fourteene, fifteene of fifteene, twentye of twentye vnities, &c.

And therefore an vnitie is no number, but the beginning and originall of number, as if you doe multiplye or deuide a vnitie by it selfe, it is resolued into it selfe without anye increase. But it is in number otherwise, for ther can be no number, how great so euer it be, but that it may contynually bee encreased by adding euermore one vnitie vnto the same.

NVMERATION is the art whereby to expresse and declare the value of anye summe proponed : and is of two kindes, the one gathereth the value of a summe proponed, and the other expresseth any summe conceaued by due fygures and places, for the value is one thing, and the fygures are another thing, and that commeth partly by the diuersitie of fygures, but chiefely by the places wherein they be orderlye sette. And therefore you must first marke that there are but tenne figures or characters which are vsed in Arithmeticke, whereof nine of them are called signifyeng fygures; and the tenth is called a Ciphar, which is made lyke an o, and of it selfe signifyeth nothing, but if it be ioyned with any of the other figures it increaseth their value, and these be they.

1	2	3	4	5	6
one	two	three	foure	fiue	sir
7	8	9	0		
seuen	eight	nine	ciphar.		

Also

Also you shall understande that euery one of these figures hath two values one is alway certain and hath his signification of his owne forme ; and the other is vncertaine which he taketh of his place.

A place is called the seat or roome that a figure standeth in, and howe manye figures soeuer are written in one summe, so many places hath the whole value thereof . And that is called the first place (which is nexte towards the right hande) of any summe, and so reckoning by order toward the left hande, so that, that place is last, which is next the left hande. And contrariwise, when you expresse the value of the figures in any summe, you must begin at the left hand, and so reckon towards the right hand.

Euery of these nine figures (which are called signifieng figures) hath his owne simple value , when hee is founde alone , or in the first place of any summe . In the second place toward the left hande, hee betokeneth his

owne value tenne times, as 70 is seuen times tenne: that is to say seuentie. 80 is 8 times ten, that is to say eightie. In the third place euery figure betokeneth his owne value an hundred times, as 700 in that place betokeneth a hundred times 7, that is to say, seuen hundred. In the fourth place euery figure betokeneth his own value a thousand times as 7000 is seuen thousand, and 8000 is eight thousand. These foure first places must be had perfectly in mind, yea and that by hart as they saye, for by the knowledge of them you may expresse all kind of numbers, how great soeuer they be.

In the fift place euerye figure betokeneth his owne value tenne thousand times: as 70000 is tenne times seuen thousand, that is to say, seuentie thousand. In the sixt place euery figure standeth for his owne value one hundreth M times. As 700000, is seuen hundreth thousande. The seuenth place, M. M. times, or a million: as 7000000, is seuen M. M. or seuen milions

millions and the eyght pace ten M, M. times or ten millions: so that euery place, toward ye left hand, exceedeth the former ten times. But nowe for the easie reading, and ready expressing orderly of anye summe proponed, you shal practise in this manner following, and for example, I propone this number 765432658, in the whiche are ix. places. In the first place is 8, and betokeneth but eyght, that is to say, once his own value, in the second place is 5, and betokeneth ten times fiue, that is 50: in the third place is 6, and betokeneth an hundred tymes sixe, that is vi. hundred. In the fourth place is 2, and that is two thousand, and 3, in the fifte place is ten thousand times 3, ye is xxx M. So 4, in the sixte place is C, thousand times 4, that is 4 hundred M. Then 5, in the seuenth place is a M. M times 5, that is fiue M M, or rather fiue millions: and 6 in the eyght place, is sixe times ten millions, that is lx. millions, and last of all vii in the ix, place, is vii, C, millions,

ons. Now followeth the practise, First put a prick ouer the fourth figure, and so ouer the seuenth, and likewise ouer the tenth, and also ouer the 13, 16, or 19 if you haue so many, and so still leauing two figures betweene euery two pricks and these roomes from one pricke to an other, are called Ternaries, then you must pronounce euerye three figures from one pricke to another, as though they were written alone from the rest, and at the ende of their value, adde so many times a thousand as your number hath prickes (that is to say, if there be but 1 prick it is but 1 M, if 2 pricks one M, M, or else a million, if 3 pricks one M, M, M, or a M millions. And so consequently of all other figures following.) Then come likewise to ỹ next iii. figures, and sounde them as if they wer apart from the rest, and ad to their value so many times thousandes, as there are prickes betweene them and the first place of your whole number. And so doe by the nexte three figures following

following, and all the rest likewise, as in example. 4 5 1 2 3 4 6 7 8 5 6 7. The first pricke ouer 8, in the fourth place which is the place of a M. the seconde pricke is ouer 4 in the seuenth place, which is the place of a M, M, or of one Million, the thirde pricke is ouer the tenth place, which is the place of a M, M, M, or of a M, millions, as in the former Example. Then for the expressing of this number by the value of euery figure, according vnto the place wherein they stand, you shall first beginne at the last pricke ouer 1, and take it and the other two figures, 5 and 4, which are behind the sayde 1, towards your lefte hande, and value them alone, and they are foure Cli, M. M, M, or else CCCCli, M millions. Then take the other three figures from 1 to the nexte pricke towardes your right hande, and value them as if they were apart from the other, and they are 234, which doe signifie CCxxxiiii. millions, or 234 M M. Then come to

the third pricke ouer 8, and take the other two figures behind it, and recken them likewiſe as if they were alone, and they are ſixe Clxxviii M. And laſt of all come to the other three figures whiche remaine, that is 567: and they are fiue Clxvii. Thus the whole ſum of theſe figures, is foure Cli. M, two Cxxxiii, millions, ſixe Clxxviii M. fiue Clvii, as before.

3. kinds of number.

Note alſo that whole number is diuided into three kindes, that is to ſay, diget number, article number, and mixte or compounde number. The diget number, is all manner of numbers vnder ten, whiche are theſe nine figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, of the which I haue ſpoken before. The Article number is anye kind whiche hath in ẏ firſt place a Cipher, as this 0, & they may euer be diuided iuſt by 10, without any remaine, as theſe 10, 20, 30, 40, 50, 100, and all other ſuche like. The mixte or compounde number conteineth diuers and manye Articles, or at the leaſt one article, and a diget, as,

Diget.

Arricle.

Mixt and cōpound.

11,

11, 12, 16, 22, 38, 108, 1007. and so foorthe. And as anye article number may be made a compounde, by putting therto a diget, euen so likewise euery compound number, may be made an Article number by adding thereunto a cipher.

And here followeth a breefe rehersall of the order and Denominators of the places. And this shall be sufficient for Numeration.

The order of the places.		The denominatours of the places.
Tenth.	4	M. of Millions.
Ninth.	3	C. of Millions.
Eyght.	2	X. of Millions.
Seuenth.	1	Millions.
Sixt.	0	C. of thousands.
Fift.	1	X. thousands.
Fourth.	8	Thousands.
Third place.	3	Hundreds.
Second place.	4	Tenths.
First place.	5	Unities.

Addition in whole number. Cap. 2.

ADdition is as much as to bring togither two summes or more into one, as if ther were due to any man 223 li. by some one body, and 334 pound by another, and 431 by another, and you would know how many pounds is due to the same man in al, these iii. summes shall you set downe orderly the one vnder the other, writing the greatest summe highest, and the nexte to the greatest vnder it, and the least summe vnder the last, in such sorte that the first figure of the one summe towardes your right hande be directly vnder the first figure of the other, and the seconde vnder the seconde, and so foorth in order. When you haue thus done, drawe vnder them a straight line, and then will they stand thus.

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431
334
223
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Now beginne alwaies at the first place towards your righte hand

hand and adde together the three firſte figures of the firſt places of theſe three ſummes , and ſee what commeth of them, & write that vnder them beneath the lyne, as in ſaying 3,4,and 1,being added togeather doe make 8: write 8, vnder 3,as here you ſee.

li
431
334
223
8

Then go to the ſecond places of figures, and doe lykewiſe, as in ſaying 2,3, and 3, make 8, write 8 vnder 2, as here you ſee.

li
431
334
223
88

And doe lykewiſe with the figures that be in the thirde place, in ſaying,2,3,and 4,are,9, put nine vnder them, and ſo will your whole ſumme appeare thus,whereby you maye perceiue that thoſe three ſummes

li
431
334
223
988

being added together doe make 988 pounde , and this is the arte of addition, according to his ſimplycitye, when the ſumme of any place doth not exceede a diget number . But in caſe the ſumme of any one place cannot bee expreſſed

expreſſed by one figure, but by two, you ſhall put the firſte of thoſe figures vnder the line, and keepe the other in your minde for to adde it vnto the firſt figure of the next place, and if the ſame next place cannot bee valued but by 2 figures, you muſt in like maner put the firſt of thoſe figures vnder the line, and reſerue the ſeconde for the other place next after it, & thus muſt you doe from one place to another vntill you haue come to the laſt place, where if it hapen you doe finde that the ſumme be of two figures, you muſt ſet them both downe because it is in the ende of that worke, as in this example.

734682456
450932345
13467891
4672123
1203754815

Where the firſte figures aſſending vpwards are 3, 1, 5 and 6, which added together

together make 15, and for that, that 15 is of two figures, I doe put the first figure 5 vnder the line, and keepe the second figure (which is 1) in my mind, the which I must adde with the next figures of the second place, that is to say with 2, 9, 4, and 5, the which together make 21. I write 1 vnder the line, for the second figure of that addition, that is to say after 5, towards the left hand and I keepe 2 to be added to the thirde place, the which with the other figures 1, 8, 3, and 4, doe make 18, therefore I put 8 next after 1 in the third place vnder the line, and keepe 1 to be added vnto the figures of the fourth place, which is with 2, 7, 2, & 2, the which with the 1 that I kepe, doe make 14: I set downe 4, for the fourth figure (vnder the line) that is to say, behind 8: and I keepe 1, to be added vnto the figures of the fifte place, the which is 7, 6, 3, and 8, the which with the 1 that I keepe, make 25: I put 5 in the fift place vnder the lyne next after 4: And I keepe 2 in

mind

minde to be added with the figures of the sixt place, that is with 6, 4, 9, and 6, and that 2 which I keepe, make 27, I write downe 7 vnder the line in the sixte place, and I keepe 2 which I adde with the fygures in the seuenth place, and they make 13: I put down 3 vnder the line in the seuenth place, and adde 1 vnto the fygures in the eight place, and they are tenne, I doe put 0 vnder the line in the eight place, and then I adde 1 vnto the ninth place, that is to say with 4 and 7, and they make twelue, the which 12 I write at length vnder the line, because it is the end of this Addition, and so is to bee done of all such like. And for the easier vnderstanding of that whiche I haue spoken of Addition, you may examine these two other examples following, in the which the firste hath these numbers, 3570, 2763, 579, and 28, which being added togither, doe make this number 6940, and in the seconde Example, doth result this number, 51683 by adding togither

of

of these numbers 47630, 3756, 272, 25, as heere vnder written.

The unmbers	3570	47630
to be added	2763	3756
	579	272
The line put	28	25
betweene.		
The summe of	6940	51683
this addition.		

Addition of li. s. d.

But if I haue any summes, whiche are compound of diuers kinds of denominations, as 25 li. 17 s. 4 d. and 14 li. 17 s. 8 d. and 16 li. 19 s. 7 d. to bee added together, I must fyrst set downe all the sayde summes, the one vnder the other, as heere you see: placing the title of pounds right vnder the pounds, the shillings vnder the shillinges, and the penies vnder the penies, keeping likewise the

li.	s.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	10.	7.

due

due order of their places, in eache de-
nomination. And then I begin aboue
at the last denomination, which are pe-
nies, and I say thus, 4 and 8 make
12, and 7 make 19 d. that is 1 shilling
and 7 d. I set downe 7 vnder the lyne
against the place of pennies, & I keepe
in mind 1 shilling to be added vnto the
place of shillings. This done, I pro-
ceede to the saide place of shillings, say-
ing 1 shilling that I keepe and 7 shil-
lings are 8, and 3 are 11, and 9 doe
make 20: I put 0 vnder the line a-
gainst 9, and doe keepe 2 in my minde,
comming then vnto y tens of shillings,
I say 2 that I keepe and 1 make 3 and
1 make 4, and 1 make 5, which are 5
tens of shillings, that is to say 2 pound
and 1 ten ouer, the which I put behinde
the 0 towards the lefte hand, vnder the
tennes of shillinges. And I doe keepe 2
pounds in my mind, then I come to the
place of pounds & saye, 2 pounds that I
keepe, and 5 are 7, and 4 are 11, and 6
do make 17 pounds, I set 7 pounds vn-
der the line against 6, & doe keepe 1 in

minde, then comming vnto the tennes of pounds, I saye 1 that I keepe, and 2 are 3, and 1 are 4, and 1 doeth make 5: the whiche 5 I write downe vnder the line behind the 7, and so is this addition ended, and then the saide 3 sums being added togither, do amount to 57 pounds 10 shillings 7 d. And thus is to bee done of all other summes of any other denominations.

Other Examples.

225.	12.	6.	5678.	13.	9.
47.	03.	9.	608.	00.	10.
38.	18.	7.	400.	17.	11.
5.	00.	8.	56.	18.	8.
316.	15.	6.	9.	12.	7.
			6754.	3.	9.

Of

Of Subſtraction in vvhole number.

Cap. 3.

Subſtraction teacheth howe you ſhall ſubſtract one leſſer number from a greater, and ſheweth what there doeth remayne after that you ſhall haue ſubſtracted the ſame, I ſpeake not of the ſubſtracting of one equall number from another equall vnto it, for the facilitie thereof requireth no rule.

In Subſtraction are founde three numbers, the one is the number, from the whiche the Subſtraction is made. The ſeconde is the number that is to be ſubſtracted, and the third is the number that remaineth after the ſubſtraction is ended. As when I woulde ſubſtract 25 from 40. The ſayde 40 is the number from the which ẏ ſubſtraction is made, & 25 is the number to bee ſubſtracted, and 15 is the number which

remaineth after you haue ended the ſubſtraction: here followeth the practiſe . You ſhall put the leſſer number vnder the greater, in ſuch ſorte that euery figure of the one number maye aunſwere vnto euerye figure of the other, orderlye according to their places, and then drawe a right line vnder theſe two numbers as you did in addition. Then muſt you beginne at the right hande, and take the firſt figure of the vndermoſte number, and Subſtracte that from the firſt figure of the vppermoſt number ouer it, and that whiche remaineth you muſt ſet vnderneath the line, right vnder the figure which you haue ſubſtracted: then afterwarde take likewiſe the ſeconde figure of the nethermoſt number, and abate that alſo from the ſeconde figure of ẏ higher number: the third from the thirde, and ſo forth of all the reſt till you come to the ende, putting alwaies the remaine of euerye figure vnder the line in his due order and place,

as

as by example. I will ſubſtract 2345, from 9876, after ÿ I haue ſet them downe according to the manner aforeſaid: then beginning at the firſt place next to my righte hande, I take firſt 5 from 6, and there reſteth 1: which 1 I ſet vnder the line righte againſt 5. Secondlye I ſubſtracte 4 from 7, and there reſteth 3, the ſayde 3 I ſet in the ſecond place vnder the line next after 1. Thirdlye, I ſubſtract 3 from 8, and there reſteth 5, the which 5 I put vnder the line in the thirde place next after 3. Finally I doe ſubſtract 2 from 9 and there reſteth 7, the whiche 7 I put vnder the line in the fourth and laſt place next after 5, and thus is this ſubſtraction ended, in the which there remaineth 7531.

9876
2345
7531

But when two figures of one likenes doe chaunce to meet, ſo that the one muſt bee ſubſtracted from the other, as if I ſhoulde ſubſtract 7 from 7, there woulde remaine nothing: then muſt I ſette a Cipher 0 vnder the line. But

when the fygure whiche is to bee substracted dooth exceed the fygure which is ouer him, so that it cannot bee taken out of the same fygure. Then must you substracte the vndermost figure from 10, and that which doth remayne, you shall adde vnto the same figure whiche is vppermost. And the summe which resulteth of them both, you shall sette vnder the line. But whensoeuer you doe borrowe anye suche 10 of the ouer number, you must adde 1 vnto the nexte vndermost figure following, whiche is yet to bee substracted. And there is nothing else to bee done in substraction Example, I will substracte 93576, from 4037479, after that I haue placed my two numbers as I ought to doe, I doe first substracte 6 from 9, & there resteth 3, then I put the 3 vnder the line right vnder the 6. And secondelye

$$\begin{array}{r} 4037479 \\ 93576 \\ \hline 3943903 \end{array}$$

I substract 7 from 7, and there resteth nothing, I doe therefore put a cipher 0 vnder the line righte against 7 in the second

seconde place. Then I come vnto the thirde place where I finde 5, which I cannot subtracte from the figure ouer it, whiche is but 4, therefore I doe subtract it from 10, as before I taught and there resteth 5, the whiche I doe adde with the 4 which is ouer it, and that maketh 9. I put 9 in the thyrde place vnder the line for the thirde fygure, Fourthly, for the 10 whiche I borrowed, I adde 1 vnto the nexte figure whiche is to bee Subtracted, whiche is 3, and they make 4, the sayde 4 I doe subtract from the ouer figure 7, and there resteth 3, I put 3 vnder the line for the fourth figure, and then I come vnto the fift place, where I doe find 9, which I cannot subtracte from the fygure ouer it, which is but 3, but I doe subtract 9 from 10, and there resteth 1, the which fygure 1 I doe adde with 3, and they make 4: I put 4 vnder the line for the fifte fygure. And here is to be noted, that if it were not for that at ẏ last I did borrowe 10, the subtraction shoulde haue beene en-

ded. But for because that I must (for euery such ten that I borrow) alwaies adde 1 vnto the next lower figure following, I must therefore proceede vnto the substraction. And for because ỹ there is no other figure following in ỹ lower number, it shall suffice to haue kept the vnitie and to substract it from the next other figure. But I find there 0, and therefore I cannot substracte 1 from 0, therfore I substract it from 10 and there resteth 9, which I put vnder the line in the first place: finallye for the tenne which I borrowed I keepe 1 in my minde: The which I do abate from 4, & there remaineth 3, the which 3 I put vnder the line in the seuenth place after 9, and the operation is thus ended.

An other Example.

57608 4026
48567 5437
9040 8589

But if there were manye numbers to bee substracted, from one number alone, then must you first adde those

numbers

numbers together, according vnto the instruction of the chapter going before, and afterwardes make your substraction as is abouesayde. As if I woulde substracte these three summes, 123, 234, 456, from 98925, firste I must adde the three summes into one, and they are 813. The which I doe substract from 98925, and there resteth 98112.

But if the summes bee compounded of diuers kind of denominations, then you must beginne at the least denomination next towarde your right hande, and so substracte euerie denomination from his like if it may be substracted, if it cannot be substracted, then you must borrowe 1 of the nexte denomination toward your left hande, and reduce the same into the like denomination of the same figure which is to bee substracted, then you shall substracte your firste or least denomination from the saide sum so borrowed, and that figure or number that shall remaine, you must adde with the vppermost number of the least

deno-

denomination, and ſette the agregate or addition vnder the line right againſt his like. Then the 1 which you did borrow muſt be added with the next figure of the next denomination that is to bee ſubſtracted, and ſo to proceede with the whole ſumme that is to be ſubſtracted.

Example.

I would ſubſtract 15 poundes, 17 ſhillings, 11 d. from 28 pounds, 13 ſhil. 9 d. I firſt put downe the great ſumme, and vnder that the leſſer with a line vnder them, as here you ſee, and then I doe begin at the leaſt denomination, which are penies, where I ſay 11 pennies from 9 pennies I cannot, and

li.	s.	d.
28	13	9
15	17	11
12	15	10

therefore I doe borrow 1 ſhilling of the next denomination, that is to ſay of the 13 ſhillings, the which 1 ſhilling is 12 pennies, then I ſubſtract 11 d from 12 d, and there remaineth 1 d, the which 1 d I ad with 9 d, and they make 10 d, the ſayd 10 I ſet vnder the lyne, and doe keepe the 1 ſhilling in my mind that I

bor-

borrowed, then I come vnto the second denomination of shillings, where I doe find 17 shillings, then I saye, 1 shilling that I borrowed and 17 make 18 shillings: the sayde 18 shillings out of 13 shillings cannot bee, therefore I do borrow 1 pound of the next denomination, that is to say out of the 28 pounds, and the said 1 pound is 20 shillings, then I substract 18 shillings from 20 shilling, and there remaineth 2 shillings, with the which I doe adde the 13 shillinges, and they do make 15 shillings, the same 15 shillings I set vnder the line, and I keepe 1 pound to be added to the lower place of pounds: then I saye, 1 pounde that I keepe and 5 are 6, I substracte 6 pound from 8 pounds and there remayneth 2, I set the sayd 2 vnder the lyne against 5: and last of all I come to the tens of pounds where I doe find 1, then I substract that 1 from 2, and there remaineth 1, which I set vnder the lyne, and so I find there remaineth 12 pound 15 shillings 10 d, and so is to be done of all other like,

Of

Of Multiplication,

Cap. 4.

IN Multiplication there are three numbers to bee noted, that is to saye, the number whiche is to bee multiplyed, the whiche wee will call the multiplicante: the seconde is the number by the whiche wee doe multiplie, whiche wee will name the multiplyer, or Multiplycatour. And the thirde number is that whiche commeth of the Multiplycation of the one by the other, which is called the product. As when I woulde knowe how much amounteth 10 multiplied by 9, that is to saye, howe much are tenne times nine. I finde that they are worth 90, then 10 is the multiplycante, and 9 is the multiplyer, and 90 is called the product. So that to multiplie, is none other thing but to finde a number which containeth the multiplicant so manye times, as the multiplier containeth vnities: As 10 multiplied by 9, doe make 90, as be-

fore

fore is sayd. And 90 containeth 10 so manye times as 9 containeth vnities, that is to say 9 times.

In multiplication, it forceth not muche which of the two numbers bee the Multiplycant, nor which bee the multiplyer, for 10 multiplyed by 9 maketh as manye as 9 multiplied by ten, yet neuerthelesse it shall be more commodious that the lesse number bee al-alwaies the multiplier.

And for that, the multiplication of figures the one by the other, is the chiefe and necessariest kind whereby to know how to worke in the multiplication of compound numbers, and that euerye man hath not the same at the fingers ende, I will therefore giue you here certaine easie waies of multiplication of diget numbers. When you would multiplie two simple figures or digets the one by the other, substract eache of those diget numbers from 10, then multiplye the two remaines the one by the other, and if the summe doe exceede 10, write onely the first figure

and keepe the other to bee added to the next operation which is thus as followeth. Adde your two simple figures togither, and of that whiche resulteth of the addition take only the first figure, vnto the which you must adde ẏ vnity which you kepte before. And that shall bee the second figure of the sum which you doe seeke. Example. I would multiplie 7 by 6, I take 7 from 10 & there resteth 3 likewise I substract 6 from 10 & there resteth 4, then I saye thus, 3 times 4 make 12, I write 2 for my first figure and I keepe 1 in my mind, then I adde 6 with 7 and they are 13, of the which I cast away the seconde figure toward the lefte hande which is 1, and I take onely the first figure 3 which is towarde my right hande, vnto the which I adde the vnity which I kepe, and they make 4, whiche I write in the seconde place after 2, and thus I find 42, which is the value of 7 multiplied by 6.

Otherwise, and all commeth to one effect: set downe your two diget numbers the one righte ouer the other, and right

right against euery of them toward the righte hande write his owne difference from 10, then multiplie the two diffe-rences together, the figure which commeth thereof you shall set downe vnder both the differences, if it bee a diget number, that is to say any number vnder 10. But if there bee two figures, set downe but the first, and keepe the other in your minde, afterwards substracte (from one of the two diget numbers that were first set downe) the difference of the other diget number, that is to saye crosse-wise, and vnto the remaine adde the figure which you kept before, and that shall bee the seconde number: and thus you shall haue your multiplication. Example of the same figures that is to saye of 7 multiplied by 6, the difference of 7 from 10, is 3, and the difference of 6 from 10 is 4, I sette them downe croswaies as you see. And then I saye three times 4 are 12: I sette

7	3
6	4
4	2

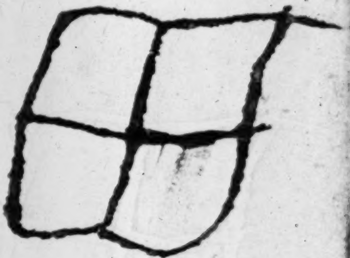
downe 2, and keepe one in my minde, then I substract 4 from 7, or else three from 6, it forceth not from whiche of them, and there resteth alwaies 3, vnto the which I adde the vnitie whiche I kepte in my minde, and they are 4, which shall be the second figure of the multiplication, and thus I finde that 7 multiplied by 6 maketh 42: as in the other operation. This practise hath no place where the two diget numbers do not exceed 10 by adding them togither, and then is the multiplication easie ynough without any rule.

Another way to knowe the multiplication of simple numbers, is by this Table following: the vse whereof is thus.

First you shall vnderstande that the numbers from 1, & so descending downwardes to 9, which are set in the lefte parte or hanging margine of this table doe betoken the multipliers of all simple numbers. And the elementes or figures being put highest, in euerye square roome drawing towardes your

right

ight hand, right against euerye of the
multipliers, doe signifie the multipli-
cants, which appertaine vnto the mul-
tipliers of the hanging margine. And
he lower or inferiour numbers in eue-
ye square roome betoken the producte
f that multiplication, which is made
n multiplyeng the vpper number ouer
it, with the figure in the hanging
margine, answering directly
vnto the said square,
as by Exam-
ple.



The Table of Multiplication by all the Diget numbers.

1	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9
2	2 4	3 6	4 8	5 10	6 12	7 14	8 16	9 18	
3	3 9	4 12	5 15	6 18	7 21	8 24	9 27		
4	4 16	5 20	6 24	7 28	8 32	9 36			
5	5 25	6 30	7 35	8 40	9 45				
6	6 36	7 42	8 48	9 54					
7	7 49	8 56	9 63						
8	8 64	9 72							
9	9 81								

First, because 1 dooth not multiplie I haue set in the vpper margine the figures from 1 to 9, both in the higher and also in the inferiour rowes, for 1 in the hanging margine multiplyed by 1, the vpper number in the first square bringeth but 1. So likewise 2 beeing the higher number in the second square of the vpper margine, multiplyed by 1 in the hanging margine bringeth 2 for the lower number in the second square of the vpper margine, For 1 times 1, maketh but 1: And 1 times 2 maketh 2, Then 1 times 3 maketh 3, and 1 times 4 maketh 4: and so continuing towardes the righte hande, vntill I come to ẏ figure of 9, which is 1 times 9 maketh 9. Then afterwardes I multiplie 2 of the hanging margine by 2, whiche is the vpper number of the square next toward the right hand, and that maketh 4, which is the producte of 2 multiplied by 2, that 4 I set vnder the 2, for 2 times 2 are 4, and 2 times 3 maketh 6, then 2 times 4 maketh 8, and 2 times 5 maketh 10, and so

continuing unto 2 times 9, which maketh 18. The like is to bee done with the third row, and so likewise of all the residue.

Example, I woulde knowe what is the producte of 9 multiplyed by 8, I seeke in the hanging margine y multiplyer 8, and amongst the squares directly against 8, drawing towarde the right hande, I seeke the multiplicant 9 in the higher rowe, and I finde the product right under 9 to bee 72, then 72 is the number whiche commeth of the multiplication of 9 by 8. And so is to be understanded of all the rest of the table, which table must bee of all men learned by heart, or as they say without booke, which being learned, you shall the better attaine unto the rest of multiplication.

To come nowe unto the practise of multiplication, when you woulde multiplye two numbers the one by the other, you must set them downe after the same manner as you did in Addition, and in substraction, that is to saye, the

first

first figure of the multiplier vnder the first figure of the multiplicant, the seconde vnder the second, and the thirde vnder the third if there be so many, and then draw a right line vnder them, as in the other operations going before, after this you shall multiplie all the figures of the multiplicant by the multiplier, and set downe the figures (comming of any such multiplication) vnder the line, euerye one in their due order and place.

Example, I would multiplie 123 by 3, that is to say, I would knowe howe much amounteth three times one hundred twenty and three. The two numbers being placed in such order as is before sayde, you must begin towards the right hand: and saye thus, three times three are 9: write downe 9 vnder the line, right against 3 for the first figure: secondlye by the same 3, you must multiplie the second figure 2, and they make 6, put downe 6 after the 9, vnder the line: Thirdlye by the same

$$\begin{array}{r} 123 \\ 3 \\ \hline 369 \end{array}$$

3, you shall multiplie the last figure 1, and they are but 3, set downe 3 after 6 for the thirde and last figure. And thus is the worke ended, whereby you shall finde that 123 being multiplied by 3, maketh 369.

But when it happeneth that of the multiplication of one figure by another, the summe which commeth thereof shall bee of two figures as it happeneth often, then shall you write downe the first figure, and keepe the other figure to be added to the multiplication of the next figure.

Example, 6 men haue gayned (euerye one of them) 345 Crownes, I woulde knowe howe manye Crownes they had in al. First I multiply 6 by 5, and they make 30, I set 0 vnder the line, and for 30 I do keepe 3 to be added to the nexte multiplication.

$$\begin{array}{r} 345 \\ 6 \\ \hline 2070 \end{array}$$

Secondly, I say 6 times 4 are 24, vnto the which I adde the 3 whiche before I reserued, and they make 27, I write 7 in the second place

vnder

vnder the line, and I keepe 2 to bee added to the next multiplication. Thirdlye I saye, 6 times 3 are 18, vnto the which I adde the 2 which I keepe, and they make 30, the whiche I write all down, for because that is the last work, and so I find that 345 being multiplied by 6, do make 2070. But when the multiplyer is of manye figures, you must multiplie all the whole multiplycant by euery one of those figures, and write the products euery one orderlye vnder his owne figure.

Example, I woulde knowe howe manye dayes are past from the Natiuitie of Jesus Christ vntill the yeare 1560 full complete. I must now multiplie 1560 by 365 daies in one whole yeare, the leape yeares not being reckoned, whiche haue euery one of them 366 daies.

Therefore first by the figure 5: I multiply all the higher fygures, saying this, 5 times 0 ma-

$$\begin{array}{r} 1560 \\ 365 \\ \hline 7800 \end{array}$$

keth 0: I write 0 vnder the line for the first figure, and because I keepe nothing for the next place, I proceed and say, 5 times 6 are 30: I set 0 vnder the line for the second figure, & I keepe 3 to be added to the next multiplication Thirdly I say, 5 times 5 are 25, the which with the 3 that I keepe are 28, I set downe 8 for the third figure, and keepe 2 to be added with the next multiplication. Then comming vnto the fourth and last figure, I saye 5 times 1 are 5, the which with the 2 that I reserued are 7, I put 7 for the last figure of this first worke by the figure 5, with the which figure I haue no more to do. And therfore I cancell the same 5 with a little stroke thorow it, to signifie that I haue done with that figure, and for so much as in multiplication there is alwaies as manye simple operations, as the multiplier containeth figures. There resteth yet 2 works to be made, I come therefore to the seconde worke, which is ẏ figure 6, by ẏ which I must againe multiplie all the figures of the

multi-

multiplicant as I did by 5, and yͤ firste figure (which shall be produced) I doe put one ranke more lower than the figures of the worke now last made by 5 not right vnder the first figure of yͤ multiplier 5, but vnder 6, that is to say one degree or place nearer toward the left hand: and one ranke more lower than the first worke: and I must put afterward euery of the other figures which commeth of the same multiplication in his order, thirdly I do make the multiplication by the third figure, and that which shall come there of I must set in his ranke, as hereafter shall appeare. And now I neede make no further discourse herof, because that he which can doe the first multiplication by 5, maye as easily doe all the others: it shal therfore suffise to set herevnder the examples of all the three sundry works.

	1560	1560
1560	65	365
5	7800	7800
7800	9360	9360
	101400	4680
		569400

Nowe, if you will knowe howe muche all the three workinges, thus placed do amount vnto, which in value must be but one number, you must adde all the numbers which are come of all the 3 multiplications together, but not after the same maner as we haue done in the chapter of Addition, the firste figure of the first ranke with the first figure of the second ranke, and so of the third, but you must ad them in the same sort as you shall find them situated and placed, that is to say the first figure of the first ranke alone by it selfe: the seconde of the first ranke, with the firste of the seconde ranke. The third of the first ranke with the second figure of the seconde ranke, and with the firste of the thirde ranke, and so of all the other, as herafter doth appeare.

And thus the 1560	1560
yeares doe contayne	365
fyue hundred sixty and	7800
nine thousande foure	9360
hundred dayes, not	4680
counting therein the	569400

dayes

daies of the leap yeares, which are here in number 390, for then the whole sum of the daies should be 569790.

An other Example.

34560
2456
207360
172800
138240
69120
84879360

The summe of Multiplication is thus, when you would multiplye anye number by 10, you shall onelye put one cipher 0 before all the numbers, that is to say, a degree nearer ẏ right hand, as 345 multiplied by 10, maketh 3450. If you wil multiply any number by 100, ad unto the same number two ciphers thus 00, if by 1000 adde 000. And to bee briefe, when the last figure of the multiplyer is 1, and all the rest be Ciphers, adde so manye Ciphers to your multiplycante, as there shall bee

found

found ciphers in your multiplier, but if in multiplieng the last figure were not 1, but that there were only certain ciphers in the beginning: and that the other were signifieng figures, and likewise those of the multiplicant, then shall you put those ciphers apart, and multiplye the signifieng figures of the one by the signifieng figures of the other. Then ad unto the product of that multiplication, all the ciphers which you did before put apart. As if I would multiplie 46000 by 3500, I put apart the three ciphers of the firste, & the two ciphers of the seconde numbers, which are in all 5 Ciphers 00000: and then I multiply 46 by 35, and thereof commeth 1610: before the which towarde the righte hand I adde the 00000 that I did put apart, and then the whole product will be 161000000.

46
35
230
138
161000000

Of

Of Diuision.

Cap. 5.

DIuision or partition is to seeke how many times one number doth contain another, or else how oft times one number may be found in another, for in the worke of Diuision there are required two numbers to bee fyrst knowne, for the fynding out of the thirde. The first number knowne, is called the diuident, or number which is to be diuided, and that must bee the greatest number. The seconde number is called the Deuisor, and that is the lesser. And the thirde number whiche I doe seeke is called the quotient. As if I would diuide 36 by 9 the diuident shall bee 36, and the diuisor is 9. And for because that 9 is contained in 36 foure tymes, that is to say, 4 times 9 doe make 36: The quotient shall bee 4, as if you marke well how many times 9 is con-

tayned

tained in 36, you shall finde it 4 times, and therefore 4 shall be the quotient.

The Practise.

Write downe first the Diuidente in the higher number, and the diuisour underneath, in such sort that the firste figure of the diuisor towards the lefte hande, bee under the first figure of the diuident, and euery figure of the same diuisor under his like, that is to say, the first under the first, the seconde under the seconde, the thirde under the third, and so consequentlye of the other, if there be so many, which is contrarye to the other three kindes before specified, but yet you must consider further, if all the lower figures of the Diuisor may be taken out of the higher figures of the Diuident, by the order of substraction or not. The which if you cannot do, then must you set the first figure of the diuisor (towarde the left hande) under the seconde figure of the Diuident, and so consequentlye the rest in their due order, if anye bee to bee set

downe

downe euery one of them vnder his like, as before is said, and then drawe a line betweene the diuident and the diuisor. And at the ende of them another crooked line, behinde the whiche towarde the right hand shall bee sette your quotient. As by this Example following, where the Deuisor is but of one figure.

If you would deuide 860 by 4, you must set downe 4 vnder the 8, with a line betweene them, as hereunder you may see.

The Deuident, 860

Deuisor, 4

And then you must seeke how many times the diuisor 4 is contained in the higher number, that is to say 860, the Diuident answering to him, as in this our example I must seeke how many times 4 is contained in 8, in the which I finde it 2 times, then I write down 2 apart behind the crooked line, as here you may see, which shall be the first figure of the quotient to come, secondlye by this figure 2 a 6 being

thus put apart) I must mul-
tiplye the diuisor 4, and vn-
der the same multiplication,
I must set the number which
commeth of the same multiplication,
as 2 times 4 makes 8, the which 8 I do
set vnder the diuisor 4. Thirdlye I doe
substract the product of the saide mul-
tiplication (of the quotiente by the diui-
sor) y is to say, 8 from the higher num-
ber correspondent to the same in saieng
8 from 8 there remaineth nothing, and
then I cancell or strike out that which
is done as you see, in these three ope-
rations and workes is comprehended
the art of Diuision. The whiche are to
be obserued from point to poynte, for
there is no diuersitie in the finishing of
the same which is thus.

860
4
8

Now secondly I must remoue my
Diuisor one place nearer towarde my
right hand, as in proceeding
with our example, here you
see I remoue my diuisor 4,
which was vnder 8, and I
set it vnder 6, then I seeke how manye
times

2
860 (21
4

times 4 is contained in 6, where I find it but one time, then I ſet 1 behind the crooked line next vnto the firſt figure of the quotient 2, a degree or place nearer my right hand, afterward by this laſt & new figure 1, I multiplie the Diuiſor 4, and that maketh but 4 (for an vnitie, which is but 1, increaſeth nothing) I abate therefore 4 from the higher figure 6, and there reſteth 2, the which 2 I ſet ouer the 6, and I cancell the 6, for ſo muſt I doe when there reſteth any thing, after I haue made the ſubſtraction. Thirdly for as much as there yet remaineth an other figure in the diuident; I remooue againe the diuiſor, and I ſet it vnder the Cipher 0. Then I ſeeke how many times 4 is in the higher number which is 20, where I may find it 5 times, I put therefore 5 behind the croked line for the third and laſt figure of ẏ quotient, then by the ſame 5 I multiply the diuiſor 4, and that maketh 20, the which 20 I a-

$$\begin{array}{l} \quad 2 \\ \cancel{8}\ \cancel{6}\ 0\ (2\ 1\ 5 \\ \hline \quad\ \ 4 \\ \quad 2\ \cancel{0} \end{array}$$

bate from the higher number, & there resteth nothing: and so is this diuision ended, and thus I haue found that 860, being diuided by 4, bringeth for the quotient 215, that is to saye, that 4 is contained in 860, two hundred and fifteene times. This is the most easiest working that is in diuision, but that which followeth appertaineth vnto the whole and perfecte vnderstanding of the same, when the firste figure of your diuisor towards your lefte hand is greater than the first of the diuident, you muste not place the firste figure of your diuisor right vnderneath the first of the diuident, but vnder the seconde figure of the same diuident nearer vnto your right hande, as before is sayde. Therefore when ẏ diuisor is of many figures, & that you haue to seeke how many times it is contained in the higher number (for the more easier working) you must not seeke to abate the diuisor all at one time, but you must see and marke howe manye times the figure of the same towarde the left hand is con-

tained

tayned in the higher number answering to the sayde number, and then to worke after the same manner as is before taught.

Example. I haue 316215 crownes to be diuided among 45 men, and for to make my diuision I must not put the first figure of the Diuisor, whiche is 4, vnder the first of the Diuident, which is 3, because that 4 is a greater number than 3. And further you know, that I cannot take 4 out of 3, wherefore I must set the 4 vnder the seconde fygure of the higher number, that is to say vnder 1, and the fygure 5 of the diuisor right vnder the 6, as here you may see.

So that I must first seeke how many times 45 is conteined in 316 which is but parte of the Diuident.

$$\begin{array}{l} 316215 \\ \hline \;45 \end{array}$$

Wherefore for the more easie working, I neede but to seeke how manye times 4 is contayned in 31. And because I may haue it 7 times, I put 7 behinde the crooked line as is aforesaid: then by

by 7, multiply all the diuisor 45, and they are 315: the whiche I set vnder the same diuisor, the firste figure vnder the first, and the other in order towarde the left hand. Then I substract 315 from the higher number 316, and of this first working there remayneth but 1, the which I set ouer the 6, and I cancell likewise the 315, and the other figures 316, and also the diuisor 45, and then it will stande thus, as in the margent.

1
~~316~~215
~~45~~ (7
~~315~~

And when I come to remooue the Diuisor, and that I must seeke howe many times it is contained in the higher number, if I see that I cannot finde it there, that is to say, that if the higher number bee lesser than the Diuisor, as it is in this Example, then must I put a Cipher in the quotient behinde the crooked line, and if there remaine anye figures in the diuident whiche are not yet finished, I must remooue the Diuisor againe neere towards my righte

hande by one place, for to find a newe figure in the quotient. As in this our exaimple, for after that I haue remoued the diuisor, I seke how many times 45 is contayned in 12, and because I cannot haue 45 in 12, I put a 0 behinde the crooked line after 7,

```
        1
  3 1 6 2 1 5
  -----------
      4 5 (70
```

then without multiplyeng or abating, I remoue againe the Diuisor nearer towards my right hande, and I seeke how mane times 4 (whiche is the firste figure of the diuisor) is in the higher number, ÿ is to say, in 12, whereas I finde it 3 times: I putte 3 behinde the crooked line for the thirde figure of the quotient:

```
      1
  3 1 6 2 1 5
  -----------
      4 5 (703
    1 3 5
```

then by the same figure 3, I multiplie the diuisor 45 and thereof commeth 135. And in the number ouer it that is but 121, so that I cannot take it out of 121, which is the lesser number. And therefore here is to bee

noted, that if it happen that the figure being laſt founde which is put in the quotient, doe produce or bring foorth a greater number (in multiplieng all the diuiſor by the ſame) than that which is ouer the ſayde diuiſor: you muſt then make the ſame figure of your quotient (which you doe put downe) leſſer by 1, and after that you haue cancelled the firſt multiplication, you muſt make a newe. And the ſame muſt bee doone ſo often times, as (in decreaſing of the ſame) it may produce a leſſer number, or at the leaſt, a number equall to that which is ouer it, as is in the laſt worke, for becauſe that the diuiſor being multiplyed by 3, bringeth foorth 135, which amounteth vnto more than 121. Therefore the ſame product muſt bee cancelled, and the figure 3 whiche I did put in the quotient, muſt bee alſo chaunged into a figure of 2. Then by the ſayde 2, I muſt multiplie the diuiſor 45, and thereof commeth 90, the which I abate from 121, and there remaineth 31. And then will the ſumme

ſtande

stand thus, as followeth.

```
    13
   31821 5
 ------------------------
       48          2
       238       (703
        99
```

And here is also to be noted, that the summe which remaineth must bee alwaies lesser than the diuisor. Then finally I remoue the diuisor to the 2 next figures toward the right hande, and I seeke how many times 4 is 31, and for because I find it 7 times, I put 7 in the quotient by the which I multiplie the diuisor, and thereof commeth 315, the which I abate from the higher number of the diuident, and there remaineth nothing as here you may see.

```
    13
   318218
 ------------------------
       48        (7027
       318
```

But if it happen that after the diui-

sion is ended, there doe remaine any thing in the Diuident, as often times there doeth: I must also set them that remaine, apart behind the crooked line, after the entire quotient, and the Diuisor right vnder the same remain, with a line betweene them both. And in this diuisor following, where there remayneth 3 in the last worke. And what the same dooth signifie shall be taught vnto you when I shall treate of fractions or broken numbers.

i.

```
 11
467859
456 (1
```

ii.

```
 11
467859 (10
456.
```

iii.

```
 2
1173
467889
456
012 (102.
```

iiii.

```
 2
11733
467880  3/456
456 (1026
2736
```

In summe all the whole practise of

diuision

diuision may be kept in remembrance by three letters, that is to saye, S, M, and A, which three letters doe signifie to seeke, to multiplie, and abate.

First, I must seeke how many times the Diuisor is contained in the higher number: then by the quotient (which I finde) I must multiplie the diuisor. Finallye, I must abate the producte of the multiplication, from the higher number correspondent to the same, that is to say, out of the diuident answering to the diuisor.

And further, besides this kinde of working in Diuision, the whiche is regular and common: I will here put another manner of working very easie. The which shall serue for such Diuisions as are more difficult to be wroght. That is to wit, when the number to be diuided is very great, and the Diuisor great also, and it shall serue againe for to auoyde errour in supputation, and for the placing of fewer figures in the quotient, and consequently it shall saue much

much labour vnto them whiche as yet haue not muche studied in this Arte. The practise whereof is thus as followeth.

If you woulde diuide 7894658 by 643, First, you shall understande that although the figure of the Diuisor towarde your left hande may bee founde many times in the higher number, as 10 times, 12 times, or more: yet is it so, that you must neuer put but one figure onely at a time in your quotient. As you shall at no time put anye number in your quotient whiche exceedeth the figure of 9, that is to say, any number being greater than 9, and therefore for to come vnto your practise, write down your diuisor one time, and behind it toward your right hand drawe a line downe straight, and right against the same diuisor behind the line toward the right hand put this figure 1, then double your said diuisor, and right against the same which you haue doubled, put behinde the line the figure of 2. This done you shall adde vnto the same number

ber that you doubled, your said diuisor, and right against the same product behind the line you shall put the figure of 3, and vnto this thirde producte, you must ad againe your diuisor, and righte against the same producte behinde the line set the figure 4, and this must you do, vntill you come to the figure of 9, in such sort that euery of the products doe surmount so much his former number, as al the diuisor doth amount vnto, placing at the right side of euery producte behind the line, the number which signifieth how much he is in order, that is to say right against the fift product, you must put 5, and right against the 6 product you must put 6, and so likewise of all the other.

The Example followeth in the next Page.

Example of the diuiſor proponed 643: Firſt of all I write downe 643, and right againſt the ſame behind the line towards my righte hande, I put 1; ſecondly, I double 643 & they make 1286 and right againſt the ſumme behinde the line, I put 2: thirdlye vnto the ſame 1286, I adde the diuiſor 643, & they are 1929, and right againſt the ſame I ſet 3. Fourthly, vnto the ſayde 1929, I adde the Diuiſor 643, and they make 2572: and righte againſte the ſame I put 4. And thus muſt you doe alwaies by increaſing ſo much euery product as the diuiſor doth amount vnto, vntill you haue ſo done nine times, as you ſee in this preſent Table.

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

This being done, you muſt ſette downe your Diuiſor vnder the Diui-dent

dent 7894658, after the same manner as is before declared, ẏ is to saye, 643 vnder the first three figures of the diuident toward your right hand, namelye vnder 789. Then must you seeke howe manye times 643 are contayned in 789. And for to knowe the same, you must looke in the foresayde Table, if you maye there find the same number 789, the which is not there. Therefore you must take a lesse number, the nearest to it in quantitie that you can finde in the Table, the which is 643 which number hath againste it on the righte hande of the line this diget 1: then take the sayde 1 and put it behind the croked line for the first figure of the quotient.

Then you must abate 643 from 789, and there will remaine 146, the same shall you put ouer the 789, and cancell the 789, and thus is the firste worke ended. Then set forwarde the Diuisor one figure nearer youre righte hande, and seeke a new quotiente, as you sought this, where you finde the

higher

higher number ouer your diuisor to bee 1464, the whiche seeke in the Table, and for because you cannot find it there you must take a lesser number the nighest to it that you can finde, and that is 1286: which number hath againste it this diget 2. Therefore you must put 2 for the second figure of the quotiente behinde the line, and then abate 1286, from the sayd 1464, and there will remaine 178. Thirdly, remoue forwarde the diuisor as you did before, and you shall fynde the higher number ouer it to be 1786, so that the next lesser number to it in your table, is againe 1286, put therefore once againe 2 in the quotient for the thirde figure, and abate the saide 1286 from 1786, so there will remaine 500.

Fourthly set forward the diuisor, and the higher number ouer it is 5005, and the next lesser number to it in your table 4501, right against the which is 7, put 7 in the Quotient for the fourth figure. And after that you haue abated 45001 from 5005, there will remayne

maine 504, Finally remoue towarde your diuisor vnto the last place, and you shall find the higher number ouer it to be 5048. And the next lesser number to it in your table, is 4501. Therfore set 7 againe in the quotient for the fift & last figure. Then subtract 4501 from 5048, & there will remaine 547: which muste bee put at the ende of the whole quotient with the diuisor vnder it, and a line betweene them in this maner following.

(12277. $\frac{547}{643}$

The summe of Diuision.

When you woulde diuide anye number by 10, you must take away the last figure nexte towardes your righte hande, and the rest shall bee the Quotient. Example. As if you woulde diuide 46845 by 10, take away the 5, and then 4684 shall bee the quotient, and the 5 shall be the number that dooth remaine. Likewise when you woulde diuide anye number by

100, take awaye the two last fygures towards your right hande, and if you woulde diuide by 1000, take awaye three fygures, if by 10000, take away foure figures. And so of al other, when the first figure of the diuisor towardes the lefte hand shall be onely 1, and the rest of the same diuisor, being but Ciphers.

Here follow the proofs of Addition, Substraction, multiplication, and Diuision.

The proofe of Addition.

When you would prooue whether your Addition bee well made consider the figures of the numbers which bee added euery one in his simple value, not hauing any regard to the place where hee standeth, but to reckon him as though he were alone by himselfe, and then reckon them all one after another casting away from them the number of

9, as

9, as oft as you may.

And after your diſcourſe made keepe in minde the ſame figure which remaineth after the nines bee taken awaye: or elſe ſet the ſame in a voyde place at the vpper end of a line. For if your addition be wel made, the like figure wil remaine, after that you haue taken awaye all the nines oute of the totall ſumme of the ſame addition, as often times as you may there finde any, as in this addition which here you ſee, there remaineth 2 for ech part.

24567	2
5329	
481	
30377	2

The proofe of Subſtraction.

ADde the number whiche you doe ſubſtract vnto that number whiche remaineth after that the ſubſtraction is made, and if the totall ſumme of that addition be like vnto the number from the which the ſubſtraction was made,

you haue done well, otherwise not, as in this example doth appeare, wher you see the number which is to bee substracted from 5463, is 3584, and the number which dooth remaine, is 1879, the which two summes being added togither, doe make 5463, which is like to the higher number, out of the which the substraction is made, as before is said.

5463
3584
1879
5463

The proofe of multiplication.

The proofe of Multiplication is made by the helpe of Diuision. For if you diuide the number produced of the multiplication, by the multiplier, you shall finde the higher number which is the multiplicant.

The proofe of Diuision.

For to know if your diuision bee well made: you muste multiplie all the quotient by your diuisor, and if anye thing doe remaine after your Diuision is made, the same shall you adde vnto

the

the product which commeth of the multiplication, and you ſhall finde the like number unto your diuident, if you haue well diuided, otherwiſe not.

Of Progreſsion.

Cap. 6.

Progreſsion arithmeticall.

PRogreſſion arithmetical is a briefe and ſpeedy aſſembling or adding togither of diuers figures or numbers, euery one ſurmounting the other continually by equall difference, as 1, 2, 3, 4, 5, &c. heere the difference from the firſt to the ſecond is but of 1, and ſo doe all the other euery one exceede his former figure by 1, ſtill to the end. Likewiſe 2, 4, 6, 8, &c. doe proceed by the difference of 2. Alſo 3, 6, 9, 12, &c. doe euerie one differ from other by 3. And ſo may theſe numbers continue infinitely after this order, in adding unto the third number the quantitie wherein the ſeconde doth differ from the firſt: likewiſe adding the ſame difference unto the fourth number, alſo to the fift, and ſo unto all the other: as 1, 4, the difference of the ſeconde to the firſte is 3, adde

3 vnto 4, and they are 7 for the thyrde
number. Then adde 3 vnto 7, and they
make 10 for the fourth number, and so
of all other.

Then if you will adde quicklye the
number of anye progression, you shall
doe thus, firste tell how many numbers
there are, & write their summe downe
by it selfe, as in this example, 2, 5 8 11
and 14 where the number of their pla-
ces are 5, as you may see, therefore you
must set downe 5 in a place alone, as I
5 haue doone here in the margent, then
shall you adde the first number and the
last together, which in this Example
are 14 and 2, and they make 16, take
halfe thereof which is 8, and multiplie
it by the fiue which I noted in the mar-
gent, for the number of the places, and
the summe which amounteth of that
multiplication, is the iust summe of
all those figures added togither. As
in this example 8 multiplied by 5, doe
make 40, and that is the totall summe
of all the figures. Another example of
parcels yͤ are euen as thus, 1, 2, 3, 4 5,

and 6. So that in this example, you muſt likewiſe note downe the number of the places as before is taught, and then adde together the laſte number and the firſt, and the ſumme which commeth of that addition, ſhall you multiplye by halfe the number of the places which before are noted, and that which reſulteth of the ſame multiplycation, is the whole ſumme of all thoſe figures, as in this former Example wher the number of places is 6, I note the 6 aparte, and then I adde 6 and 1 together, which are the laſt and firſt numbers, and they make 7, the which I multiplie by 3, which is halfe the number of places, and they make 21, and to ſo much amounteth all thoſe figures added tog[ether].

Queſtions done by Progreſsions Arithmeticall.

1. A Marchant hath ſolde 100 kerſies after this manner folowing, that is to ſaye, the firſt peece f[or]

1 s. the second peece for 2 s. the thirde for 3 s. and so forth, rising 1 s. in euery peece of kersie vnto the hundred peece. The question is to know, how much he shall receiue for the said 100 peeces of kersies? Answere, It behooueth you to know the addition of the 100 termes in this progression: And therefore you must adde 1 s. which is the price of the first peece with 100 s. which is ẏ price of the last peece, and thereof commeth 101, the same 101 you must multiplye by halfe the number of places, that is to say by 50, and therof commeth 5050 shillinges, which being diuided by 20 shil. therof will come 252 li. 10 s. 0 d. which is 2 li. 10 s. 6 d. a peece, one with another, Thus the 100 kersies are sold by the sayd marchant for 252 li. 10 s. 0 d. The practise followeth.

101	~~1~~ ~~1~~	
50	~~5~~0~~5~~0	(252 li. 10 s.
5050	~~2~~~~2~~~~2~~0	

Queſtions of Progreſsion.

2 I Would lay 100 ſtones or other things in a right line, and euery of the ſaid ſtones to bee a iuſt pace one from another, and one pace off from the firſt ſtone there ſtandeth a basket, I demaund how many paces a man ſhall go in gathering vp the ſaide ſtones, and bearing them vnto the basket the one ſtone after the other? Anſwere, Firſt when he fetcheth the firſt ſtone and putteth it into the basket, hee maketh two paces, for the ſecond foure paces, for the third 6, for the fourth 8: and ſo forth vnto the laſt ſtone: wherefore the laſt terme ſhall be 200: vnto the which you muſt ad the firſt terme which is 2, and they make 202, wherof the halfe is 101 the which you ſhall multiplie by 100, which is the number of the termes in your progreſſion: Or elſe multiplye 202 by 50, which is halfe the number of places, and thereof will come 10100 paces, and ſo many paces ſhall hee goe in all.

Queſtions of Progreſsions Arithmeticall.

3. There is a Meſſenger whiche goeth euerye daye 8 mile , an other man followeth him incontinently and he goeth the firſt day 1 mile, the ſecond day 2 miles, the thirde day three miles, and ſo increaſing his iourny euery day one mile by naturall progreſſion. The queſtion is to know, in how manye daies the ſeconde man ſhall haue ouertaken the firſte. Aunſwere, you muſt conſider that 8 is the middle or halfe as well of the termes, as of the number of the daies: and therefore double 8, therof commeth 16: ſubſtract 1, and there will remaine 15, and in ſo many daies ſhall hee haue ouertaken the firſt meſſenger, the proofe thereof is very eaſie. If the seconde had gone the firſt day 2 miles, the seconde daye 4 miles, the thirde daye 6 miles, and ſo increaſing euery daye his iournie, by 2, in how many daies ſhoulde hee haue ouertaken the firſt man, for to

doe

doe this, you muſte perceiue that 8 is the middle and fourth terme. Therfore double 4, and they make 8, from the which ſubſtract 1, and there remaineth 7, and in ſo many daies hee ſhould haue ouertaken him.

Queſtions of Progreſsions Arithmeticall.

4. A Certaine man departeth from London to Cheſter, and ſo to Carnaruan, the diſtance beeing about 200 miles, he goeth the firſt day 1 mile the ſecond day 2 miles, the third day 3: and ſo orderly by naturall progreſſion. An other man departeth at the ſame inſtant from Carnaruan to London, and goeth the firſt day 2 miles, the ſecond day 4 miles, the third day 6 miles, and ſo increaſing euery day 2 miles. The queſtion is to know in how many daies the ſame two perſons ſhall meete togither.

Aunſwere, firſte you muſt conſider that hee whiche goeth by Progreſſion naturall

naturall maketh but halfe the way that the other dooth, so that hee shall haue made but one thirde parte of the waye at their meeting togither. Take therefore the $\frac{1}{3}$ part of 200, and you shall haue $66\frac{2}{3}$, then must you seeke 2 numbers, whereof the greater of them may be double vnto the other, lesse 1: and that the one of them being multiplyed by the other, the product of them maye be $66\frac{2}{3}$, or little more, so that the more do not exceede the value of the greater terme, as here in this question the two nearest numbers are 12 and $6\frac{1}{2}$, which multiplied the one by the other, do make 78, whiche is $11\frac{1}{3}$ more then is $66\frac{2}{3}$: wherefore that daye when they shoulde meet togither, the first had done but $\frac{2}{3}$ of a mile of his iournie, which was vpon the 12 daye, then if you will knowe what part of a day that they did meete you must diuide $\frac{2}{3}$ by 12, and you shall finde $\frac{1}{18}$ of a day. Therfore in 11 daies and $\frac{1}{18}$ part of a day, that is, vppon the twelfe day they shall meete together.

5. If

5 IF any man doe owe mee 1000 crownes, to bee payde in 20 daies or termes, by Arithmeticall progression. The question is, to know with what number he shall begin and continue his progression? Answere: To doe this you must adde 1 unto 20, And they make 21, the which you shall multiplie by 10, which is halfe the number of places, and therof commeth 210, and therfore diuide 1000, by 210 and thereof will come 4 $\frac{16}{21}$ the payment of the first day, and by this number doth the said progression encrease, in this sort following: 4 $\frac{16}{21}$, 9 $\frac{11}{21}$, 14 $\frac{6}{21}$, 19 $\frac{1}{21}$, &c. and so of all others.

A man oweth me 400 li. to bee paide in 10 yeares by progression Arithmeticall, that is to say, 40 li. At the ende of the first yeare, and euery yeare following 40 li. to the ende of 10 yeares: hee offreth to pay me the said 400 poundes all at one paiment. The question is to know, at what time hee oughte to paye mee the same at one paymient, that I

bee

be not interessed in the time? Answere, Adde 1 unto the number of the termes, which are 10, & they make 11, whereof you must take the halfe, y is to say $5\frac{1}{2}$: Therefore he must pay me at 5 yeare & $\frac{1}{2}$ the said 400 li. al at one time, for that which he paieth before, is equall to that which remaineth unpaid.

This rule hath place onely when the payments are equall. But if it happen that the last paiment bee lesser than the others, you must in this case put the last payment over one of the others, for to make therof a fraction, the which must be added unto the number of the terms, & the halfe of the said sum being taken shall shew the time the saide paymente ought to be paid at once, as if the sayde partie did owe mee but 380 li. to bee paid every yere 40 li. it is certain that he must haue 10 yeares to end the paymentes. And it is true that uppon the 10 day there would remaine but 20 li. to be paide, and therefore put 20 over 40 in this sort, $\frac{20}{40}$, and that maketh $\frac{1}{2}$ y which you shall ad unto the number of termes, and you shall haue $10\frac{1}{2}$, whereof

of the halfe which is $5\frac{1}{4}$, doeth shewe that he must pay the sayde 380 li, at 5 yeares $\frac{1}{4}$, al at one paiment, and so of al such like.

Progression Geometricall is when the second number containeth the first in any proportion: as 2, 3, or 4 times, and so foorth. And in like proportion shall the third number containe the second; and the fourth number containe the third, and the fift the fourth, &c. As 2, 4, 8, 16, 32, 64: here the proportion is double.

Likewise 3, 9, 27, 81, and 243, are in triple proportion.

And 2, 8, 32, 128, and 512, are in proportion quadruple.

That is to say, in the first Example, when the proportion is double, everye number containeth the other 2 times, as 4 containeth 2 two times, 8 containeth 4 two times, &c. In the second example of triple proportion, the numbers exceede eche other three tymes, and in the thirde example, the numbers exceede eche other foure times, & thus

you

you see that progression Arithmeticall differeth from progression Geometricall, for that that in progression Arithmeticall, the excesse is onely in quantitie, but in progression Geometricall, the excesse is in proportion.

Now, if you will easily find the sum of any such numbers, you shall do thus, consider by what number they be multiplied, whether they bee multiplied by 2, 3, 4, 5, or by any other, and by the same number you muste multiplie the last summe in Progression, and from the product of the same multiplication, you shall abate the first number of the progression. And that which remaineth of the said multiplication you shall diuide by 1 lesse than was that number by the which you did multiplie & the quotient shal shew you the sum of al ye numbers in any progression. As in this example, 5, 15, 45, 135, 405, which are in triple proportion: now must you multiplie 405, which is ye last number, by 3, because they are in triple proportion, and they are 1215, from the which you

you ſhall abate the firſt number of the progreſſion which is 5, and there remaineth 1210, the which you ſhall diuide by a number leſſer by 1 than that was by the whiche you did multiplie, that is to ſay, by 2, and you ſhall find in the quotient 605, which is the total ſum of the numbers of that Progreſſion. Likewiſe 4, 16, 64, 256, and 1024, whiche are in proportion quadruple: therefore you ſhall multiplie 1024 by 4, and thereof will come 4096 from the which abate the firſt number 4, & there will remaine 4092. The which you muſt diuide by 3, and you ſhall finde in your quotient, 1364, which is the totall ſumme of that progreſſion, and this ſhal be ſufficient for progreſſion.

A queſtion of Progreſsion Geometricall.

A Merchant hath ſolde 15 yardes of ſattin, the firſt yard for 1 ſhilling, the ſecond 2 ſhil. the third 4 ſhil. the fourth 8 ſhil. and ſo increaſing by double progreſſion Geometricall. The queſtion

is

is to knowe, how much the sayde marchant shal receiue for the said 15 yards of satten? Answere, firste it is needfull to knowe howe muche the whole numbers of the said progression doe amount vnto togither. And for to doe it, you must finde the last tearme, therfore you must set downe the said progression vnto the 8 terme, which is 128: the which you shall multiplie by it selfe, and therof commeth the 15 terme, that is to say 16384: the same shall you multiply by 2, for because the progression is double. And thereof will come 32768, from the which you must substracte the firste terme, which is 1. And the rest beeing 32767, is the iust sum of the 15 terms, and consequently the 15 yards of sattin shall be worth 32767 shillinges, the which are 1638 li. 7 s.

The

The 7 chapter treateth of the rule of three, called the Golden rule, or the rule of foure Proporcionals.

The Rule of three is the cheefest, the most profitable, and the most excellent Rule of all the rules of Arithmeticke. For all other rules haue neede of it, and it passeth all other, for the which cause, it is sayde that the Philosophers did name it the golden rule, & after others opinion and iudgement, it is called the rule of proportion of foure numbers. But nowe in these latter daies by vs it is called the rule of three, because it requireth three numbers in his operation. Of the which three numbers, the two first are set in a certain proportion, & in such proportion as they bee stablished, this rule serueth to find out vnto ẏ third number, the fourth number to him proportioned in such sort as the second is proportioned vnto the first. Not for that that the foure numbers, nor yet the three are or be propor-

tionall, or set in one proportion, but such proportion as is from the firste to the second, ought to be from the thirde unto the fourth, that is to saye, if the seconde number doe containe the firste two times or more, so manye times shall the fourth number containe the third. And note well that the first number and the third in euery rule of three ought and must be alwaies of like denomination, and of one condition and nature. And the second number and the fourth, must likewise bee of one semblance and likenesse, and are dissemblant and contrarye to the other two numbers: that is to say, to the first and the third. And if you doe multiplye the first number by the fourth, & the second number by the thirde, the products of your two multiplications will bee equall. Likewise if you diuide the one semblant by the other, that is to saye, the third number by the first, and likewise the one dissemblant by the other, that is to saye, the fourth number by the seconde (which are dissemblant to

the other two numbers, your quotients will also be equall.

The stile and manner of this rule is thus: you must sette downe your three numbers in a certaine order, as by example fellowing shall appeare. And then you shall multiply the thirde number by the second, and the producte or number that commeth of the same multiplication you must diuide by the firste number: or otherwise diuide the firste number by the seconde, and the quotient thereof shal be your diuisor vnto the third number, that is to saye, the thirde number shal be diuided by the quotient of the foresaid diuision, that is by ẏ quotient of the first number diuided by the second. Or otherwise, diuide the seconde number by the firste, and that number which commeth into your quotient, you shall multiplie by the thirde number. And thus shal you haue the fourth number that you seeke for. And thus is your fourth number in such proportion vnto the third, as your seconde number is vnto the first.

Example.

If 8 be worth 12, what are 14 worth after the rate? Or else if 8 require 12, for his proportionall, what will 14 demaunde, the whiche three numbers may conueniently be set in such order, as hereafter dooth appeare.

If 8 make 12, what will 14 make, you must multiplie the thirde number 14 by the seconde which is 12, and therof commeth 168 for the whole producte of this multiplication, the which (as the rule teacheth) you must diuide by the first number, that is to say by 8, and thereof commeth 21. And so much are the 14 worth. This is the waye which is most vsed.

```
                          14
                          12
                    ------------------
8.     12.     14.        28
                          14
                    ------------------
                         168

168 | 21
 88 |
```

Other-

Otherwise, diuide 8 by 12, which you cannot doe, for they are $\frac{8}{12}$, wherfore abreuy $\frac{8}{12}$, and they are $\frac{2}{3}$ for youre quotient, then diuide ye thirde number 14, by the said $\frac{2}{3}$, multiplying 14 by 3, which maketh 42: diuide 42 by 2, and you shall haue 21 as before. Or else diuide the seconde number 12 by the firste number 8, and thereof commeth 1 $\frac{1}{2}$, the which 1 $\frac{1}{2}$ you shall multiplie by the third number 14, and thereof will come 21, as is abouesayde, and thus must you doe of all other, and although that the numbers of this rule maye bee found in three differences, for sometimes they are whole numbers and broken togither, sometimes broken number, & broken togither, and sometimes all whole numbers. If they bee whole numbers, you must doe none otherwise than you did in the last example. But in case they bee broken numbers, or broken and whole numbers togither, the manner and waye to

2
4
8
12
6
3

doe them, requireth a certaine variation and difficultie, according vnto the varietie of the numbers that shall bee proponed: the which operation easily to doe, and vnvariable, this rule teacheth.

The three numbers being set downe according vnto the order of the whole numbers aforesaid, without any broken number, let 1 bee put alwaies vnderneath euerye whole number with a line betweene them, fraction wise, as thus $\frac{8}{1}$, and that is 1 denominator to euerye such whole number. But when you haue whole number and broken togither, they must bee reduced and added with their broken number, and if there bee broken number without anye whole number, the same broken must remaine in their estate.

The rule of 3 in Fractions.

This being doone, you shall multiplye the denominator of the first number, by the numerator of the seconde

and

and multiplie the product therof again by the numerator of the third number. And so shall you haue the diuidente, or number which must bee diuided, then multiplie the numerator of y^e first number by the denominator of the second, & multiplie againe the product thereof by the denominator of the thirde number, and that which commeth of this multiplication shall bee your diuisor. Then diuide the number which is to bee diuided by the diuisor, and you shall finde the fourth number that you seeke. Of the which manner and fashions of the rule of three, are diuers kinds, whereof the first is of three whole numbers, as was the last Example, & here followeth the second.

If 15 pounds doe buie me 2 clothes, howe manye clothes will 300 poundes buie me, of the same price that the two clothes did cost. Set downe your three numbers thus.

The Example followeth in the next Paage.

Lib.	Clothes.	Lib.	
15.	2.	300.	2
		2	600
		600	155 (40
		1	

And then as you see, you must multiplie the third number which is 300 li. by 2, which is the second number, and thereof commeth 600, the which 600 you must diuide by the first number 15, and you shall finde in your Quotient 40, which is 40 clothes, and so manie clothes shall you buy for 300 poundes, as appeareth by practise here aboue written, and here you must marke that the first number and the thirde in this question be of one denomination, as before I haue declared and likewise the seconde and the fourth numbers, which you haue founde are of one semblaunce and likenesse, but in case that the firste number and the third in anye question bee not of like denomination, you must (in working) bring them into one denomination or nature, as in this Example

ample following. If 12 nobles doe gaine me 6 French Crownes, how manye French Crownes will 48 poundes gaine me? Here you see that the denomination of the first number is nobles, and the denomination of the thirde is poundes: wherefore, before you doe proceede to worke by the Rule of three, you must first turne the poundes into nobles, in multiplyeng 48 pounds by three Nobles, and they make 144 nobles, for that there is in euery pounde of monie 3 nobles: or otherwise, if you will, you maye bring the firste number beeing 12 Nobles into poundes, by diuiding them by three, and thus shall your first & third numbers bee brought into one denomination, then shall you set downe your three numbers in order thus.

If 12 Nobles do gaine me 6 frenche Crownes, what shall 144 Nobles gaine: the whiche 144 are the Nobles whiche are in 48 li. Then multiplye the thirde number 144, by the seconde number 6, and thereof commeth 864, the

The which you must diuide by 12 Nobles, and thereof commeth 72 Frenche Crownes.

And so many French Crownes will the 144 Nobles gaine mee.

Nobles.	Crownes.	Nobles.
12	6	144

144	~~120~~	Nobles.
6	~~864~~	(72
864	~~122~~	
	~~1~~	

There is yet a more exacte waye, whereby to worke in this rule of three, whiche is thus, you must marke if the thirde and first numbers in the rule of three may be both diuided by one like diuisor, the which after you haue diuided them, you shall write downe eache of the quotients orderlye in the sayd rule of 3, euery one of them in his owne place, as though those were two of the numbers of your question, and not changing the middle number, that

is

is to saye the seconde. And thus, if 50 Crownes doe buie mee 44 yardes of cloth, how many yards shall I haue for 120 Crownes? Here you may see that the third and the first numbers may be diuided by 10, which in the third number, is founde 12 times, and in the first 5 times. Wherefore you shall put 12 for the thirde number in the rule of three, in steed of 120: and 5 for the first number in stead of 50, and let 44 remain still in yͤ middest for the second number, after this sort as followeth, and then worke by the rule, as before.

Crownes.	Yards.	Crownes.	
5	44	12	
	12		
	88	3	
	44	528	(105 $\frac{3}{5}$
	528	888	

You must multiplie 44 by 12, and thereof commeth 528, diuide the same 528 by 5, and you shall finde in youre quotient 105 $\frac{3}{5}$, and euen so manye

yardes

yardes shoulde you haue founde, if you had wrought the rule of three, by the first numbers proposed. There is yet certaine other varieties in working by the rule of three, but for that they require the knowledge of Fractions, and because they are not so easie as this first way, which is common, therefore content your selues with this same, vntill you haue learned the Fractions, the which by Gods helpe I intende to set forth in the second part of this booke, incontinentlye after that I haue firste taught you the backer rule of three.

Of the backer rule of three.

The backer rule of three is so called because it requireth a contrarye working vnto that whiche the rule of three direct dooth teache, whereof I haue now treated. For in the direct rule of three, the greater the thirde number is so much the greater will the fourth be, But here in this backer rule it is contrariwise, for the greater the thirde

number

ber is, so much lesser will the fourth be. Then whereas in the rule of three direct, the third number is multiplyed by the second, and the producte thereof diuided by the first, here you must multiplie the seconde number by the first, and diuide the producte of the same by the third, and the number which commeth in the quotient, aunswereth to the question. For such practise commeth often times in vse: In such sorte that if you shoulde worke the same by the rule of three direct, and not to haue a regarde vnto the proposition of the question, you shoulde then commit an euident and open errour.

Example.

If 15 shillinges woorth of Wyne will serue for the ordinarie of 46 men, when the tunne of Wine is woorth 12 poundes: for howe manye men will the same 15 shillinges woorth of wine suffise, when the Tunne of wine is woorth but 8 poundes: It is cer-

taine

taine, that the lower the price is, that the Tunne of Wine doth cost, and so many more persons, will the sayde 15 shillings in wine suffise. Therefore set downe your numbers thus: if 12 poundes suffise 46 men, for how many men will 8 poundes suffise: you must multiplie 45 by 12, and thereof commeth 552, the which 552 you shall diuide by 8, and thereof commeth 69, and vnto 69 men will the said 15 shillinges worth in wine suffise, when the Tunne of wine is worth but 8 pounds as hereafter doth appeare by practise.

Lib.	men.	Lib.
12	46	8
	12	7/
	92	882 (69
	46	88 71
	552	

2 Likewise, a messenger maketh a iournie in 24 daies, when the daye is but 12 houres long: in howe manie

daies

dayes shall he make the same iournye, when the day is 16 houres in length: Here you must perceiue that the more houres there are in a daye, the fewer daies will the messenger bee in going his iournie. Therefore write downe your numbers thus, as heere you maye see.

Houres.	Daies.	Houres.	
12	24	16	~~4~~
	12		~~12~~
	48		~~288~~
	24		~~166~~
	288		~~1~~ (18

And then multiply 24 daies by 12 houres, and thereof commeth 288: diuide the same 288, by the thirde number 16, and you shall find 18, the which is 18 daies, and in so many dayes will the messenger make his iournie, when the daye is 16 houres long.

Likewise when the bushell of wheate doth cost 3 shillings, the penie loafe of bread weigheth 4 pound.

I

I demaunde what the same pennie lofe shall weigh, when the bushell of wheate is worth but 2 s. Here is to be considered, that the better cheape the wheat is, the heauier shall the pennie lofe weie, and therefore write downe your three numbers thus.

Shil.	Lib.	shil.	
3.	4.	2.	
	3.		12 Lib.
	12.		2 (6.

Then multiplie 4 li. which is the second number, by the first number 3, and they make 12, the which 12 you shall diuide by the thirde number: and thereof commeth 6 li. and so much must the pennie lofe of bread wey, when the bushell of wheate is worth but 2 shillinges as maye appeare, and nowe according to my former promise, shall follow the second part of Arithmetick, which teacheth the working by Fractions.

Here endeth the first part of Arithmetick.

The second part of Arithmeticke, which treateth of Fractions, or broken numbers.

The first Chapter treateth of Fractions, or broken numbers, and the difference thereof.

A Fraction, or a broken number, is as much as a part of manye parts of 1, whereof there are two numbers with a line betweene them both, that is to say, the one which is aboue the line is called the Numerator, and the other vnderneath the line is called the denominator, as by example, three quarters is called a fraction, which must be set downe thus $\frac{3}{4}$, whereof 3 which is the higher number aboue the line is called the numerator, and 4 which is vnder the line, is called the Denominator. And it is alwaies conuenient that the Numeratour bee lesse in number than the Denominatour. For if the Numerator and the

denominator be equall numbers, then shal they present a whole number thus, as $\frac{1}{1}$, $\frac{2}{2}$, $\frac{3}{3}$, which are whole numbers, by reason that the Numerators of these & all such like, may be diuided by their denominators, and their quotients will alwaies be but 1. But in case that the Numerator of any fraction doe exceede his denominator, then it is more than one whole, as $\frac{29}{18}$ is more than a whole number by $\frac{11}{18}$. And this is commanlye called an improper fraction, other diffinition dooth not hereunto appertaine. Furthermore it is to be understood that when the numerator is iust the halfe of the denominator, then the same broken number is the iust halfe of one whole, as $\frac{6}{12}$, $\frac{7}{14}$, $\frac{8}{16}$, $\frac{9}{18}$, and other like, are the halfes of one whole number, whether it be of monie, of measure, of weight, or any other thing, whereof doth grow and come forth 2 progressions naturall, the one progreding by augmenting or increasing, as these.

$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{7}{8}$, $\frac{8}{9}$, $\frac{9}{10}$, &c.

And

And they doe proceede infinitlye, and wil neuer reach to make a whole number thus $\frac{1}{1}$. And the other progreſſion, dooth progredie by diminiſhing or decreaſing, as thus.

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}$, &c.

And theſe doe proceed infinitlye, and ſhal neuer come to make a o which ſignifieth nothing, but ſhall euer retayne ſome certaine value of an vnitie whereby it doth appeare that fractions or broken numbers are infinit.

The ſecond Chapter treateth of the reducing or bringing together of 2 fractions, or many, of diuers denominations, vnto fractions of one like denomination.

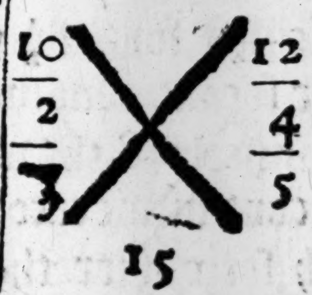
Reduction, is as much as to reduce and bring togeather, or to put two or many numbers, being of diuers denominations the one from the other, into Fractions of one Denomination,

to reducing them into a common denominator, and the reason thereof is, For because the diuersitie and difference of the broken numbers do come of the denominators part, or of diuers denominators, and for the understanding hereof, there is a generall rule, whose operation or working is thus: Multiplye the denominators of the Fractions the one by the other, and so you shall haue a newe Denominator common to all the Fractions, the which Denominator you must diuide by the particular denominators of euery of the said fractions, and multiplie euery quotient by his owne numerator, and so you shall haue new numerators, for ỹ numbers which you would reduce, as appeareth by this example following.

Reduction in common denomination.

1 If you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ togeather, first make a crosse betweene the 2 fractions, as here you see, and then you

you must multiplie the two denomina-tors the one by the other, that is to saye, 3 by 5 maketh 15, which is your com-mon denominator, set that vnder the crosse, then diuide 15 by the denominatour 3, and you shall haue 5, which



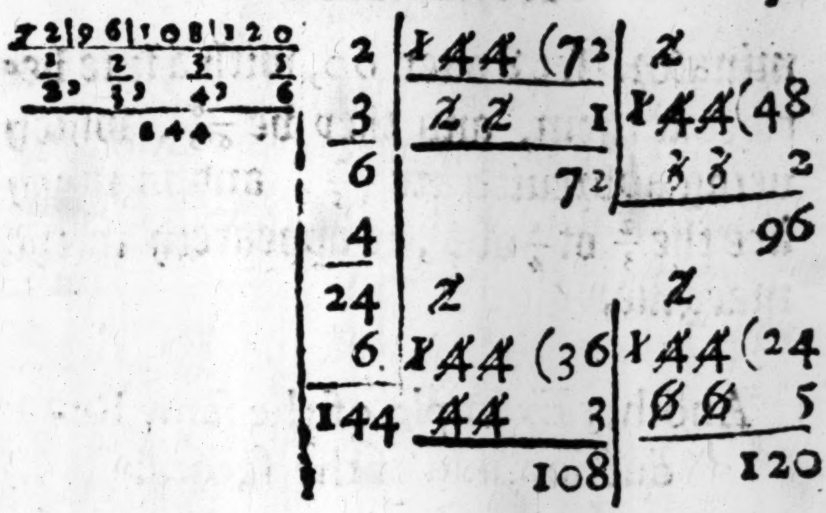
multiply by the numerator 2, and you shall finde 10, set that ouer the $\frac{2}{3}$, and they are $\frac{10}{15}$ for the $\frac{2}{3}$. Afterwards di-uide 15 by the Denominator 5, and thereof commeth 3, the which multi-plie by the Numerator 4, and you shall finde 12, which sette ouer the heade of the $\frac{4}{5}$ and they make $\frac{12}{15}$ for the $\frac{4}{5}$, as appeareth more plainer aboue in the margent.

2. If you wil reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, togea-ther, you must multiplie all the Deno-minators the one by the other, that is to saye, 2 by 3 maketh 6: then 6 by 4 amounteth to 24. Last of all 24 by 6, and thereof commeth 144, for the com-mon denominator, then, for ye first frac-

tion which is $\frac{1}{2}$, diuide 144 by the Denominator 2, and thereof commeth 72, the which multiplie by the numerator 1, and it is still 72, set that ouer the $\frac{1}{2}$ & that is $\frac{72}{144}$, for the $\frac{1}{2}$: Then diuide 144 by the second denominator 3, and thereof commeth 48, the which multiplye by the second numerator 2, & they are 96, which sette ouer the $\frac{2}{3}$ and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then diuide 144 by the third denominator 4, and thereof commeth 36, the which multiplye by the third numerator 3, and they make 108: which set ouer the $\frac{3}{4}$, and they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finally diuide 144 by the last denominator 6, and thereof commeth 24: The which multiplie by the last numerator 5, and thereof commeth 120 which set ouer the $\frac{5}{6}$, and they are $\frac{120}{144}$, for the $\frac{5}{6}$, as appeareth here by practise.

The Example followeth in the next paage.



Reduction of broken numbers of broken.

3. If you will reduce the broken of broken together, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must multiplye all the numerators, the one by the other to make one broken number of the three broken numbers, that is to ſay 2 by 1 maketh 2, and then 2 by 4 maketh 8, which 8 is your numerator. Then multiplie the Denominators the one by the other, that is to ſay, 3 by 4 maketh 12, and then 12 by 5 maketh 60 for your denominator

	8	
2,	1,	4
3	4	5
	60.	

minator, set 8 ouer 60, with a line betweene them, and they be $\frac{8}{60}$, which being abbreuied are $\frac{2}{15}$, and so much are the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$, as appeareth in the margine.

Another Example of the same Reduction, and of the second reduction.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{5}{7}$: And the $\frac{1}{2}$ of the $\frac{3}{2}$ of the $\frac{2}{3}$ of $\frac{1}{3}$. First it behooueth you of euery partie of the broken number, to make of each of them one broken, as by the third reduction is taught: that is to saye, in multiplyeng of numerators by numerators, and Denominatours by Denominators. First, for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$, you must as is before sayd, multiplie 2 by 1, and then by 4, and you shall haue 8 for the Numerator, likewise multiply 3 by 4, and the product by 5, and you shall haue 60 for the Denominator, so they make $\frac{8}{60}$, which being abreuied, are $\frac{2}{15}$, for ye first

first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$, secondly for the $\frac{3}{4}$ of $\frac{5}{7}$ multiplie likewise the numerator 3 by 5 maketh 15, for the numerator. And multiply 4 by 7 maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the second part, that is to say, for the $\frac{3}{4}$ of $\frac{5}{7}$. Thirdly, for the $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{3}$, you must multiply the Numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, and all maketh but 2, for the numerator: likewise multiply the Denominators 2 by 2 maketh 4, 4 and by 3 maketh 12, and then 12 by 3 maketh 36, for the Denominator, and they are $\frac{2}{36}$, which being abreuiated maketh $\frac{1}{18}$ for the third part, that is to say, for $\frac{1}{2}$ of the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{3}$. Last of all take the $\frac{2}{15}$, the $\frac{15}{28}$, and the $\frac{1}{18}$, and reduce them according to the order of the seconde Reduction, and you shall finde $\frac{1008}{7560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{15}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$: and thus are broken numbers of broken, reduced, as appeareth by practise.

8
2/8, 1/4, 4/5 — 60

2/1, 3/4, 2/8 — 2/12, 4/60 — 4/8, 5/60, 15

25 — 3/4, 5/7 — 28

2
1/2, 1/2, 2/3, 1/3 — 36

1/1, 1/2, 2/2, 1/2 — 2/2, 4/3, 12/3, 36 — 1/2, 6/18

1008 — 2/15 — 4050 — 15/20 — 420 — 1/18
7360

15 | 202
28 | 7560 (504
120 | 1588
30 | 11
420
18
3360
420
7360

18
300
2 | 7560 (270
1008 | 2888 15
22

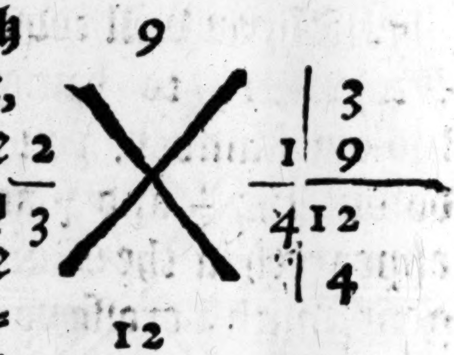
1350
270
4050

1
330
7560 (420
1888
11
1
410

Reduction of broken numbers, and the parts of the same.

5. If you will reduce $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$ together, to bring them into one broken number, you must firste sette downe the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the Margent, with a crosse betweene them, and then multiplye the two denominators, the one by the other, that is to say, 2 by 3 maketh 6, set that vnder the crosse, then multiplie the first numerator 1, by the last denominator 2, and that maketh 2, vnto the which adde the last numerator 1, and they be 3, which set aboue your crosse, so you shall finde that the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$ doe make $\frac{3}{6}$, which being abbreuied dooth make $\frac{1}{2}$: which is as much as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, being reduced into one fraction. Likewise if you will reduce the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{2}{3}$, you must doe as beefore, set downe the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse betweene

betweene them, then multiply the two denominators the one by the other, that is to saye 3 by 4, maketh 12: which set vnder yͤ crosse, as you see in the Margente: and then multiplye the first numerator 2, by the last Denominatour 4, and thereof commeth 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set ouer the crosse, so shall you finde that the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, are worth $\frac{9}{12}$, the which abbreuiated do make $\frac{3}{4}$, as appeareth by example in the margent.



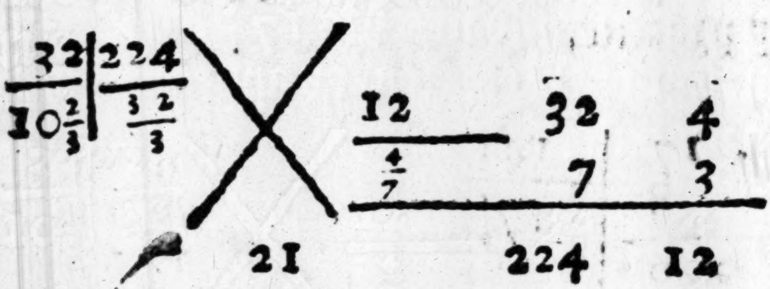
Reduction of whole numbers and broken together into a Fraction, the which fraction is called an improper fraction.

If you will reduce whole number & broken into broken, you shall reduce the whole number into broken, as by this example may appeare. If you will reduce 17 $\frac{5}{8}$ into a broken number, first you must multiply the whole number 17 by the Denominator of the broken, which is 8, in saying eight times 17 do make 136, vnto the which you must add the numerator of $\frac{5}{8}$ which is 5, and all amounteth vnto 141, which set ouer $\frac{5}{8}$, with a line betweene them, and they will be $\frac{141}{8}$, so much is 17 $\frac{5}{8}$ woorth in an improper fraction, as appereth here by practise.

$$\begin{array}{r|c|}
17 & 141 \\
8 & \overline{17\frac{5}{8}} \\
\hline
136 & \\
5 & \\
\hline
151 &
\end{array}
\qquad \text{maketh } \frac{141}{8}$$

In

In case you haue whole number and broken to be reduced with broken, you must bring the whole number into his broken: in multiplyeng it by the denominator of the broken number going therewith, and adde therevnto the Numerator of the sayde broken number, as in the last example is declared, and then reduce that broken number with the other broken, as here appeareth by this Example. Reduce 10, $\frac{2}{3}$ and $\frac{4}{7}$ together, first bring 10 $\frac{2}{3}$ all into third as it is taughte by the firte Reduction, and you shall finde $\frac{32}{3}$, then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together, by the first reduction, and you shall finde $\frac{224}{21}$ for the $\frac{32}{3}$ and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth here by practise.



Also in case you haue in both parts

of your reduction, as well whole numbers as broken, you must alwaies put the whole of each part into his broken, as by the 6 reduction is taught.

Example.

If you will reduce 12 $\frac{1}{4}$ with 14 $\frac{2}{3}$, to bring them into one denomination, first bring the 12 $\frac{1}{4}$ all into fourths, and you shall find $\frac{49}{4}$, then likewise reduce 14 $\frac{2}{3}$ all into thirds, and you shall haue $\frac{44}{3}$ for the 14 $\frac{2}{3}$: then reduce $\frac{49}{4}$ and $\frac{44}{3}$ together by the order of the first reduction, and you shall find $\frac{147}{12}$ for the $\frac{49}{4}$. And $\frac{176}{12}$ for $\frac{44}{3}$, as here by practise doth appeare plainely.

49	44	147		176
12 $\frac{1}{4}$	14 $\frac{2}{3}$	$\frac{49}{4}$		$\frac{44}{3}$

12

The third Chapter teacheth of Abbreuiation of one broken number into a lesser broken.

ABbreuiation is as much as to sette downe, or to write a broken number by figures of lesser signifycation, and not diminishing the value thereof. The whiche to doe there is a Rule, whose operation is thus, diuide the numerator, and likewise the Denominator by one whole number, the greatest that you may finde in the same broken number, and the quotient of that numerator, make it the Numerator, and likewise of that of the Denominatour, make it your Denominatour, as by example.

1. If you will abbreuiate $\frac{54}{81}$, you shal understand that the greatest whole number that you maye take, by the which you may diuide the Numerator and the Denominator is 27, which is the half of the denominator, and that is a whole number, for you cannot take a whole number out of the Denominator 81,

81, which will diuide both the Numerator & denominator, but that there will bee either more or lesse than a whole number, therefore if you diuide 54 by 27, you shall finde in the quotient 2 for the numerator, likewise if you diuide 81 by 27, you shal haue in the quotient 3 for the denominator, then put 2 ouer the 3, with a line beetweene them, and you shall finde $\frac{2}{3}$, and thus by this rule the $\frac{54}{81}$ are abreuied vnto $\frac{2}{3}$, as appeareth in the margine, and so is it to be vnderstood of all other.

$$\frac{54}{81}$$

$\cancel{10}$
$\cancel{54}$ (2
$\cancel{27}$

$$\frac{2}{3}$$

$\cancel{10}$
$\cancel{81}$ (3
$\cancel{27}$

Abbreuiation.

If you wold know how to find the greatest nūber by the which you may wholy diuide the numerator and denominator, to the end you may abbreuiate them, is thus.

First diuide the denominator by his numerator, and if any number doe remaine, let your diuisor be diuided by the same number, and so you must continue vntill you haue so often times diuided, that there may nothing remaine, then is it to bee vnderstood that your last Diuisor (whereat you did end, and that 0 did remaine after your diuision) is the greatest number, by the which you must abbreuiate as you did in the last example. But in case that your last diuisor be 1, it is a token that the same number cannot be abreuied to any lower fraction then you find it at the first, Example of $\frac{54}{81}$, diuide 81 which is the denominator by 54, which is his Numerator, and there resteth 27, then diuide 54 by 27, and there remaineth a 0, which is nothing, wherefore your

last

last Diuisor 27 is the number by the which you must abbreuiat $\frac{54}{81}$: as in the last example is specified.

Another maner of Abbreuiation.

2. Mediate the numerator and also the Denominator of your Fraction, in case the numbers be euen, that is to say, take alwaies the halfe of the Numerator, and likewise of the Denominator, and of the mediation or halfe of the numerator, make it your numerator, also of half that denominator make your denominator, & so continue as often as you may in taking alwaies the half of the numerator, & likewise of the denominator, or else see if you maye abbreuiate the numbers whiche doth remayne, by 3, by 4, by 5, by 6, by 7, 8, 9, or by 10, for you must abbreuiate them as often as you can by any of the sayd numbers, and it is to bee noted, that with whatsoeuer number of these, you dre abbreuiate the numerator of your fraction, by the same you must abbre-

uiate likewise the denominator, so continuing vntill they canne no more be abbreuied, and it is to be vnderstood, that if the numerator and the Denominator be euen numbers, as you maye knowe when the first figure of an euen number, or a o, then you may perceyue if both the Numerator and the Denominator may be abbreuied by 10, by 8 by 4, or by 2 : albeit that sometimes they may be abbreuied by 3. And if they be odde numbers, then must you consider if they may be abbreuied by 9, by 7, by 5, or by 3, but when the firste number, as well of the numerator, as of the denominator are euen numbers, then maye you well knowe that such numbers may be abbreuied by 2, as is aforesayd. And if you adde the figures of the numerator together in such manner as you doe in making the proofe by 2 in whole numbers, that is if you finde 9, it appeareth that you maye abbreuie that number by 9. And likewise by 3, and sometimes by 6, if you finde 6 it may bee abbreuied by 6, and

alwaies

alwaies by 3, if you finde 3, it is a signe that you abbreuiat by 3. And by what soeuer number that you doe abbreuiate the numerator, by the same muste you abbreuiate likewise the denominator, and if the first figures of the same number be 5 or 0 you may abbreuiate them by 5, but if the first figures bee both 0, they may be abbreuied 10, in cutting away the 2 ciphers thus, as $\frac{2}{3}|\frac{0}{0}$ which maketh $\frac{2}{3}$, and sometimes by 100 thus, as $\frac{1}{2}|\frac{00}{00}$, in cutting awaye the foure ciphers after this sorte, $\frac{1}{2}|\frac{00}{00}$ and then the $\frac{100}{200}$ doe make $\frac{1}{2}$, and after this maner haue I set here diuers examples, although that all broken numbers can not be abbreuied by this rule, yet al fractions may be well abreuied by the first rule aforesayd.

abreuied.

$\frac{3840}{7680}$ by 10	$\frac{1890}{4725}$ by 9
$\frac{384}{768}$ by 8	$\frac{210}{525}$ by 7
$\frac{48}{96}$ by 6	$\frac{30}{75}$ by 5
$\frac{8}{16}$ by 4	$\frac{6}{15}$ by 3
$\frac{2}{4}$ by 2	$\frac{2}{5}$
$\frac{1}{2}$	

3. Furthermore you shall vnderstande that sometimies it happeneth, that all the figures of the numerator are equall vnto them of the denominator, which when it so happeneth, you maye then take one of them of the numerator, and also one of them of the denominator, and it shall be abbreuied, as $\frac{555}{888}$, being abbreuied after this maner, commeth to $\frac{5}{8}$. And yet it happeneth sometimes that two or manye figures of the Numerator are proportioned vnto two, or manye figures of theyr Denominator, and that the other figures of ye same number are the figurs

one

one to the other in this proportion following. Then maye you take two or more figures, as well of the numerator as of the denominator, and by this maner the same number shall be abreuied, $\frac{4747}{5959}$ being abbreuied by this Rule, doe come to $\frac{47}{59}$.

4. Also it happeneth sometymes that you would abreuiate one number vnto the semblance or likenesse of an other. And for to know if the same maye bee abbreuied, and also by what number it may be abbreuied, you must diuide the numerator of the one number, by the numerator of the other, and likewise the Denominator of the one by the denominator of the other, for in case that after euery diuision there doe remaine 0, and that the two quotients be equall, then is one of them the number by the which the said fraction must be abreuied, as by example of $\frac{115}{207}$. I would know if they may bee abbreuied vnto $\frac{5}{9}$, and for to doe this, you must diuide a 115 by 5, and you muste diuide 207 by 9, and there will

come into both the quotients 23 by the which it appeareth that this number may be abbreuied by 23.

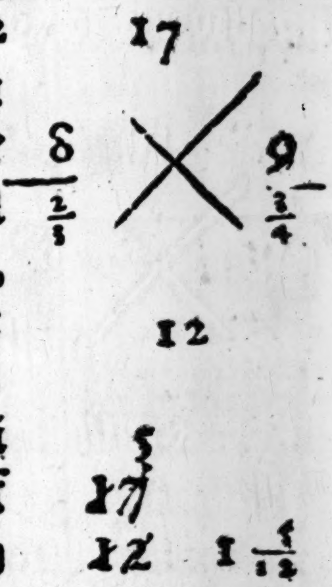
$$\frac{115}{207} \qquad \frac{5}{9} \qquad \begin{array}{l} \cancel{1}\cancel{0} \\ \cancel{1}\cancel{1}\cancel{5} \\ \cancel{5}\cancel{5}\ (23 \end{array} \qquad \begin{array}{l} \\ \cancel{2}\cancel{0} \\ \cancel{2}\cancel{0}\cancel{7} \\ \cancel{0}\cancel{0}\ (23 \end{array}$$

The 4 Chapter treateth of the adding of two or many broken numbers together.

FOR to adde Fractions or broken numbers together, there is a generall rule, which is thus, if the numbers bee of vnlike denominations, the one to the other, you must reduce them into a common Denomination by the doctrine of the first reduction, and when you haue reduced them, you must then adde both the Numerators together, and set the product of the sayd addition ouer the crosse and diuide the same Numerator by the common Denominator

nator, as by example following.

1. If you will adde $\frac{2}{3}$ with $\frac{3}{4}$, you must firste reduce the two Fractions both into one denomination according to the order of the first reduction, that is to saye, in multiplyeng the Denominator of the first fraction which is 3, by the denominator of the other fraction whiche is 4, and they make 12 for your common denominator: the which 12 you shal set vnder ẏ crosse, then multiplie the first numerator 2 by the last denominator 4, & thereof commeth 8 which set ouer the $\frac{2}{3}$, and



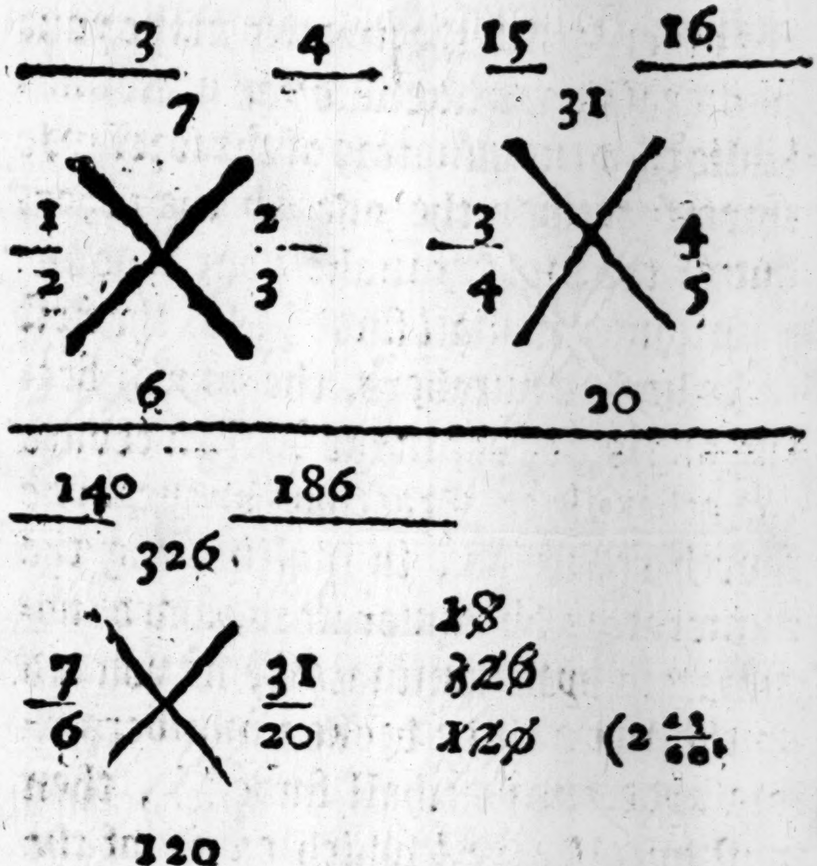
then multiply the last numerator 3, by the first Denominator 3, and thereof commeth 9, which you must set ouer the $\frac{3}{4}$, then adde the numerator 8 with the Numerator 9, and they make 17, which set ouer the crosse, and then your fraction

fraction will be $\frac{17}{12}$: which is the addition of $\frac{2}{3}$ with $\frac{3}{4}$. And because the numerator 17 is greater than his Denominator 12, therefore you must diuide 17 by 12 and thereof come 1, and 5 remaining, which 5 you must set aparte, and 12 vnder the same with a line betweene them, and they are worth $\frac{5}{12}$, and so much are the $\frac{2}{3}$ added with $\frac{3}{4}$, as doth appeare.

Addition in broken number.

2. Also if you will adde $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ togeather, you must first adde the $\frac{1}{2}$ & $\frac{2}{3}$ together, according to the doctrine of ye last rule, and you shall find $\frac{7}{6}$: then ad $\frac{3}{4}$ and $\frac{4}{5}$ together, by the sayd last rule, and they make $\frac{31}{20}$, then finally adde the $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added together with $\frac{31}{20}$, which came of the $\frac{3}{4}$ and $\frac{4}{5}$ added together, and you shall finde by the foresayde Addition, that they amount vnto $\frac{326}{120}$. Wherefore diuide 326 by 120, and thereof commeth 2, & 86 remaineth which is $\frac{86}{120}$ of one

one whole, and they being abbreuied do make $\frac{43}{60}$, and thus the $\frac{1}{2}\,\frac{2}{3}\,\frac{3}{4}$, and $\frac{4}{5}$ bee-ing added together, do amount to 2 and $\frac{43}{60}$, as hereunder doth appeare.



Addition of broken number of broken.

3. Furthermore, if you will adde the broken numbers of broken togeather

as

as to adde $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$, with the $\frac{5}{6}$ of $\frac{1}{2}$ of $\frac{5}{8}$: first you must reduce the numbers according to the order of the fourth reduction, in multiplyeng the numerators of the first 3 fractions the one by the other, and of the product make your numerator, and likewise you must multiplie the denominators of the foresayde three fractions the one by the other, and of the product make your denominator, and you shall finde $\frac{24}{60}$ for the first three broken numbers, the which beeing abbreuied doe make $\frac{2}{5}$, then reduce the other three Fractions by the sayde fourth reduction, in multiplyeng the numerators by numerators, and denominators by denominators, as you did by the firste three broken numbers aforesayde, and you shall finde $\frac{25}{96}$, then must you adde the $\frac{2}{5}$ which came of the first 3 broken numbers, and $\frac{25}{96}$ which are come of the last 3 fractions, both togither by the instruction of the first addition: & you shall finde $\frac{317}{480}$: which cannot be abbreuied, but is the iuste product of the addition: so much are $\frac{2}{3}$

of

of $\frac{3}{4}$ of $\frac{4}{5}$ added with the $\frac{5}{6}$ of $\frac{1}{2}$ of $\frac{5}{8}$, as hereafter by practise doth euidently appeare.

$$\frac{24}{\frac{2}{3},\ \frac{3}{4},\ \frac{4}{5},}\ \ \frac{}{60}\qquad \frac{2}{5}\qquad \frac{25}{\frac{5}{6},\ \frac{1}{2},\ \frac{5}{8},}\ \ \frac{}{96}$$

$$317$$

$$192 \qquad 125$$

$$\frac{2}{5} \times \frac{25}{96} \quad \frac{317}{480}$$

$$480$$

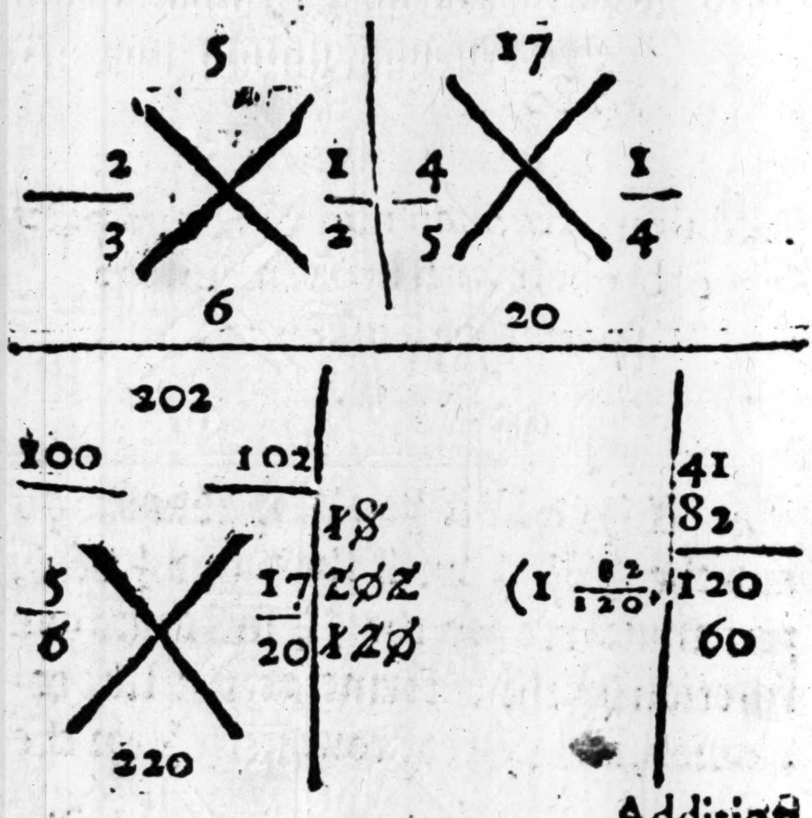
Addition of broken number, and parts of broken with broken, and the partes of broken together.

4. Likewise if you will adde the $\frac{2}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$ with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{3}{4}$, you must reduce the $\frac{2\ 1}{3\ 2}$ firste into one fraction by the doctrine of the like reduction, and thereof commeth $\frac{5}{6}$ for the

$\frac{2}{3}$ and

$\frac{2}{3}$ and $\frac{1}{2}$ of one of the sayd thirdes: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the sayd fift reduction, and thereof commeth $\frac{17}{20}$.

Last of all adde the $\frac{5}{6}$ and $\frac{17}{20}$ together according to the first rule of addition: and you shall find $\frac{202}{120}$, which being diuided bringeth 1, and $\frac{82}{120}$ part remayning, which abbreuied maketh $\frac{41}{60}$, and thus you doe perceiue that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$, added with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, doe amount vnto 1 $\frac{41}{60}$, as hereafter by practise doth plainly appeare.

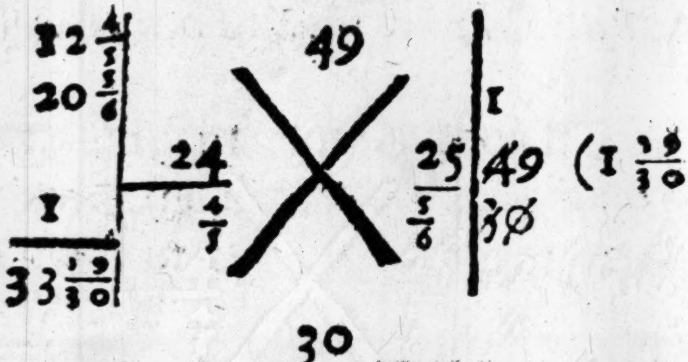


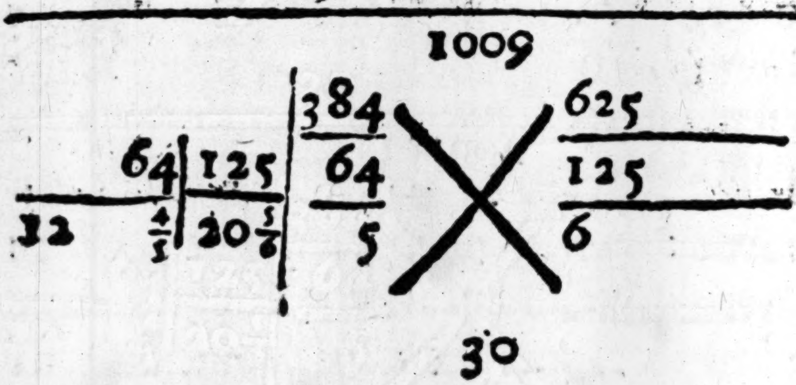
Addition of whole number and broken with whole number and broken.

5. Also if you will adde 12 $\frac{4}{5}$ with 20 $\frac{5}{6}$, you may (you may if you will) adde 12 and 20 together, and they make 32 the which you shall set apart, and then adde the two broken numbers together that is to say, $\frac{4}{5}$ and $\frac{5}{6}$ by the order of the first addition, and they make $\frac{49}{30}$, therefore divide 49 by 30, and thereof commeth 1 and $\frac{19}{30}$ parts remayne, which you must ad unto the 32 which were put apart, and the whole addition will be 33 $\frac{19}{30}$: or otherwise, you may reduce 12 $\frac{4}{5}$ into the likenesse of a Fraction by the order of the first reduction, and they will be $\frac{64}{5}$, and likewise by the same reduction, reduce 20 $\frac{5}{6}$, & they be $\frac{125}{6}$, then adde $\frac{64}{5}$ with the $\frac{125}{6}$ by the first addition, and you shall finde $\frac{1009}{30}$. Therefore divide 1009 by 30, & thereof commeth 33 $\frac{19}{30}$ as before, & as by practise of the same both wayes doeth heereafter ap-

peare

peare.





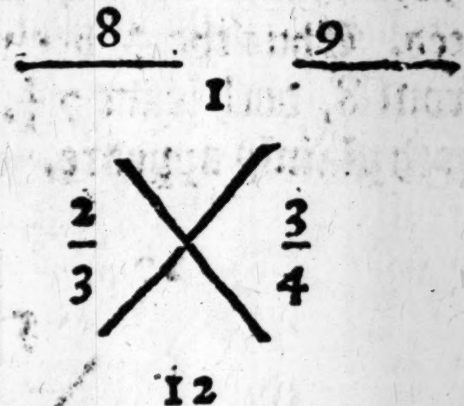
11
~~1~~ ~~0~~ ~~0~~ 9 (33 29/30
~~3~~ ~~3~~ ~~0~~

The fift Chapter treateth of Substraction in broken numbers.

1 If you will substract $\frac{2}{5}$ from $\frac{3}{4}$, you must first reduce both the Fractions into a common denomination, by the doctrine of the first reduction, and

you

you shall finde $\frac{8}{12}$ for the $\frac{2}{3}$, and $\frac{9}{12}$ for the $\frac{3}{4}$. Therfore abate the numerator 8 from the numerator 9, and there wil remaine 1, which 1 you must set ouer the crosse, and the same is $\frac{1}{12}$, and so much is the rest of that substraction, as may appeare here by practise.



2 But if you haue a broken number to bee substracted from a whole number, you must borrowe 1 vnitie of the whole number, and resolue it into a fraction of like denomination, as is that fraction, which you would abate from the same whole number, and then abate the saide fraction therefrom, and you shall finde what dooth remaine, as by this example. If you abate $\frac{4}{5}$ from

8, you must borrow one of the sayde 8, & resolue it into fifties like vnto ẏ fraction, because it is $\frac{4}{5}$, and that 1 will be 5 fifties thus $\frac{5}{5}$, therefore abate $\frac{4}{5}$ from $\frac{5}{5}$, and there will remaine $\frac{1}{5}$, and substract the 1 which you borrowed from 8, and there doth remaine 7, and the $\frac{1}{5}$ also which remayned after the sayde $\frac{4}{5}$ were abated. Thus the $\frac{4}{5}$ beeing substracted from 8, doth leaue 7 $\frac{1}{5}$. as by practise doth plainly appeare.

8
1
7 $\frac{1}{5}$

20 25
5
$\frac{4}{5}$ $\frac{5}{5}$
5 $\frac{1}{5}$
25

Or otherwise you shall put 1 vnder 8 with a line betweene, and that will be $\frac{8}{1}$: then set downe the $\frac{4}{5}$ and the $\frac{8}{1}$ with a crosse betweene them, then you must reduce them into one denomination by the first reduction, and you shall finde 4 ouer the $\frac{4}{5}$, and 40 ouer the $\frac{8}{1}$,

then

then ſubſtract the ſaide 4 from 40, and there will remaine 36, the which you ſhall ſet ouer the croſſe, and they doe make $\frac{36}{5}$. Likewiſe you muſte multiplie the denominator 5 by 1, maketh 5, ſet that vnder the croſſe, then diuide 36 by 5, and thereof will come $7\frac{1}{5}$, as before, for the reſt of that ſubſtraction as here by practiſe appeareth.

4   40   39

$\frac{4}{5}$ X $\frac{8}{1}$

5

8 (1 $\frac{84}{4}$ 8 (5 $\frac{48}{40}$ $\frac{4}{36}$

1
36 (7 $\frac{1}{5}$
5

3 If you will ſubſtract broken number from whole number and broken: as if you woulde ſubſtract $\frac{3}{4}$ from $6\frac{5}{6}$, you may by the firſt ſubſtraction, abate $\frac{3}{4}$ from $\frac{5}{6}$, and there will remaine $\frac{1}{12}$, & the 6 doth ſtill remaine whole, becauſe the $\frac{3}{4}$ may well bee abated from the $\frac{5}{6}$,

and thus $\frac{3}{4}$ beeing abated from 6, and $\frac{5}{6}$ leaueth 6 $\frac{1}{12}$, as appeareth by practise.

$$\begin{array}{l} 6\ \frac{5}{6} \\ 9\ \frac{3}{4} \\ \hline 6\ \frac{1}{12} \end{array}$$

$$\begin{array}{ccccc} \underline{18} & & 2 & & \underline{20} \\ \frac{3}{4} & & \times & & \frac{5}{6} \quad \frac{1}{12} \\ & & 24 & & \end{array}$$

Likewise, if you will abate $\frac{2}{3}$ from 14 $\frac{2}{5}$, you must first reduse 14 $\frac{2}{5}$ all into fifties by the first reduction, and they be $\frac{72}{5}$, then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall finde $\frac{10}{15}$ for the $\frac{2}{3}$, and $\frac{216}{15}$ for the $\frac{72}{5}$: then substract the numerator 10 of the first fraction, and 216, of the seconde fraction, and there remaineth $\frac{206}{15}$. Therefore diuide 206, by 15, and thereof commeth 13 $\frac{12}{15}$, and so much remaines of this substraction as may appeare in the next page following.

10 216

206

72

14 $\frac{2}{3}$

$\frac{2}{3}$ X $\frac{72}{5}$

15

1
21
~~28~~
~~200~~ (13 $\frac{11}{15}$
~~188~~
~~1~~

4 If you will ſubſtract whole num-ber and broken, from whole and bro-ken: as thus, if you will ſubſtract 9 $\frac{1}{4}$, from 20 $\frac{1}{2}$, you muſt reduce 9 $\frac{1}{4}$, into fourthes, and likewiſe the 20 $\frac{1}{2}$ into halfes by the firſt reduction, and you ſhall finde $\frac{37}{4}$ for the 9 $\frac{1}{4}$: and $\frac{41}{2}$ into one Denomination: according unto the firſte reduction, and you ſhall finde $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{164}{8}$, for the $\frac{41}{2}$, then abate the numerator of $\frac{74}{8}$,

which is 74, from 164 which is the numerator of $\frac{164}{8}$, and there remaineth $\frac{90}{8}$, then diuide 90 by 8, and therof commeth 11 $\frac{1}{4}$, which is the remaine of this substraction.

$$\frac{37}{9}\ \frac{1}{4} \quad \Big| \quad \frac{41}{20\frac{1}{2}} \quad \Big| \quad \frac{74}{\ } \quad 90 \quad \frac{164}{\ }$$

$$\frac{37}{4} \quad 8 \quad \frac{41}{2}$$

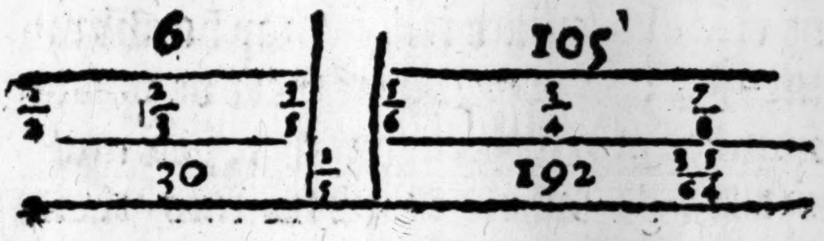
$$\begin{array}{r} 164 \\ -\ 74 \\ \hline 90 \end{array} \qquad \begin{array}{l} 12 \\ \cancel{9}\cancel{0}\ (11\frac{1}{4} \\ \cancel{8}\cancel{8} \end{array}$$

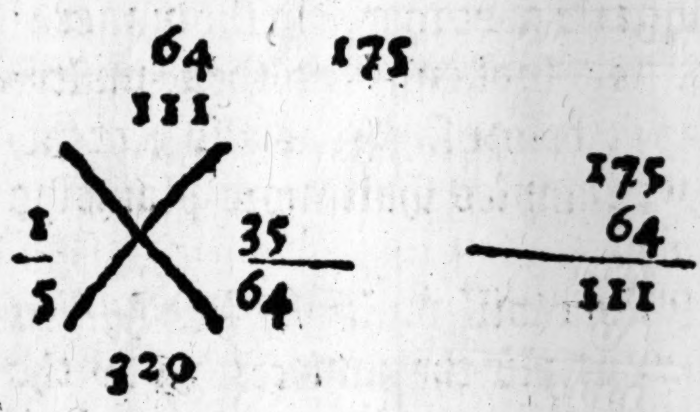
Substraction of broken numbers of broken, from fractions of fractions.

5 If you will substract the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$, from the $\frac{5}{6}$, of $\frac{1}{4}$ from $\frac{7}{8}$, you must first bring the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ into one fraction, by the 3 reduction: and the $\frac{5}{6}$ of $\frac{1}{4}$ of $\frac{7}{8}$, likewise into one fraction, by the same reduction, and you shall finde $\frac{6}{30}$ for the first

first

first 3 broken numbers, which beeing abreuied do make $\frac{1}{5}$, and for the other three broken numbers, you shall finde $\frac{105}{192}$: which beeing likewise abbreuied doe make $\frac{35}{64}$, then you shall subtract $\frac{1}{5}$ from $\frac{35}{64}$ by the instruction of the first subtraction in reducing both the fractions into a common denomination, as before is done, and you shall finde remaining $\frac{111}{320}$, as may appeare by example.





The sixt Chapter is of Multiplication in broken numbers.

FIrst for to multiply in broken number, there is a rule which is thus, you muste multiplie the numerator of the one fraction, by the numerator of the other, and likewise you must multiplie the denominator of the one by the denominator of the other. And then diuide the fraction, if it may bee diuided, or else abbreuiate it, if it may be abbreuied, & it is done, but if there be whole number and broken together, you must reduce the whole numbers into their broken, and adde therunto the numerator of his broken, and then multyplye as is before sayde, as also heereafter by examples shall more plainelye appeare.

1 If you will multiplie $\frac{2}{5}$ by $\frac{3}{4}$, you must multiplie the numerator 2 by the numerator 3, and thereof commeth 6, for the numerator. Likewise you must multiplie the denominators, the one by the

the other, that is to saye, 3 by 4, and thereof commeth 12 for the denominator: so that this multiplication commeth to $\frac{6}{12}$, which being abbreuied doe make $\frac{1}{2}$: and so much amounteth the multiplication of the $\frac{2}{3}$ by $\frac{3}{4}$, as by practise appeareth.

$$\begin{array}{ccc} & 6 & \\ \hline \frac{2}{3} & & \frac{3}{4} \\ \hline & 12 & \end{array} \qquad \begin{array}{c} 1 \\ \frac{6}{12} \\ 2 \end{array}$$

2 Likewise if you will multiplie a broken number by whole number, or whole number by broken, which is all one, as $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, you must set 1 vnder 18, thus $\frac{18}{1}$, & then multiply the numerator 18 by the numerator 4, and thereof commeth 72. Likewise multiplie the denominator 5, by the denominator 1, and thereof commeth 5, then diuide 72 by the denominator 5, and therof commeth 14 $\frac{2}{5}$, for the whole multiplication. Or otherwise, abate from 18 his $\frac{1}{5}$ part, which is 3 $\frac{2}{5}$, & there remaineth 14 $\frac{2}{5}$, as hereafter followeth

$$\frac{3}{5}\ \overline{\underline{\quad 72 \quad}}\ \frac{15}{4} \qquad \begin{matrix} \cancel{2} \\ \cancel{7}2 \\ \cancel{8}\cancel{8} \end{matrix}\ (14\tfrac{2}{5}$$

$$5$$

Or otherwise.

$$\frac{18}{1}\ \overline{\underline{\quad 18 \quad}}\ \frac{1}{5} \qquad \begin{matrix} 3 \\ \cancel{1}\cancel{8} \\ 8 \end{matrix}\ (3\tfrac{3}{5} \qquad \begin{array}{r} 18 \\ 3\tfrac{3}{5} \\ \hline 14\tfrac{2}{5} \end{array}$$

$$5$$

3 Also if you will multiplie a whole number, by whole number and broken, or else whole number and broken, by a whole number, which is all one, as by example: if you will multiply 15 by 16 $\frac{3}{4}$, or else 16 $\frac{3}{4}$, by 15: First reduce 16 $\frac{3}{4}$ all into fourthes, in multiplying 16 by the denominator of $\frac{3}{4}$, which is 4, and thereof commeth 64, whereunto adde the numerator 3, and it maketh $\frac{67}{4}$: which multiplie by $\frac{15}{1}$, according to the instruction of the last example, and you shall finde the product of this multiplication to be 251 $\frac{1}{4}$, as by practise in the next page following dooth appeare.

67	1005	67	
$16\frac{3}{4}$	$\frac{67}{4}$ $\frac{15}{1}$	15	
	4	335	
		67	
		1005	

$251\frac{1}{4}$

4 And if you will multiplie a broken number, by whole number and broken or else whole number and broken by a broken. As by example, if you will multiplie $\frac{1}{4}$ by 18 $\frac{2}{3}$, or else 18 $\frac{2}{3}$ by $\frac{1}{4}$, which is all one, you muste reduce the whole numbers intc his broken by the first reduction, and you shall finde $\frac{56}{3}$, which you shall multiplie by the $\frac{1}{4}$, after the doctrine of the first multiplication, that is to saye, in multiplying the Numerator 56, by the Numerator of $\frac{1}{4}$, which is 1: and it is still 56, because 1 doth neither multiplie nor diuide, and likewise you must multiplie the denominator 3, by the denominator 4, & it maketh 12: then diuide 56 by 12 and therof commeth 4 $\frac{2}{3}$. And so much amounteth ẏ multiplication of ẏ said 18 $\frac{2}{3}$ mul-

$\frac{2}{3}$ multiplied by $\frac{1}{4}$, as by example.

56 $\frac{2}{8}$ 18	56 $\frac{56}{1}$ $\frac{1}{4}$ 12	~~18~~ ~~88~~ ~~12~~ (4 $\frac{2}{5}$

5 If you will multiplie whole number and broken, with whole and broken, you must firste put either whole number into his broken, according to the instruction of the sixte reduction, and then multiplie the one numerator by the other, and of the product make your numerator. And likewise multiplie the denominators the one by the other, and thereof make the denominator: then divide the numerator by the denominator, and the quotient shall be the increase of this multiplication. Example. If you would multiplie 12 $\frac{4}{5}$ by 6 $\frac{3}{4}$: first by the sixt reduction that 12 $\frac{4}{5}$ will make $\frac{64}{5}$: and the 6 $\frac{3}{4}$ will make $\frac{27}{5}$, then multiply the numerator 64 by the numerator 27, and thereof commeth 1728 for the numerator. And then you must multiplie the denomina-

tor

tor 5, by the denominator 4, and they do make 20: then diuide 1728 by 20, and thereof commeth 86, for the whole multiplication, as by example.

	1728		64	1	
	64	27	27	$\cancel{1}\cancel{7}28$	
12	$\frac{4}{5}$	$6\frac{3}{4}$	448	$2\cancel{0}\cancel{0}$	$(86\frac{2}{5}$
			128	2	
	20		1728		

6 If you will multiplie one broken number, by manye broken numbers, thus: as to multiplie $\frac{2}{3}$ by $\frac{5}{7}$, and by $\frac{4}{9}$, you must multiplie the numerators of all the fractions, the one by the other, and of the product make the numerator, that is to say, 2 by 5, and they bee 10, then 10 by 4, and they bee 40, for the Numerator. Likewise you must multiply the denominators the one by the other: that is to say, 3 by 7 maketh 21, then 21 by 9 maketh 189 for the denominator: then set 40 ouer the 189 with a line betweene them, and they make $\frac{40}{189}$. And so much amounteth

the

the whole multiplication of the $\frac{2}{3}$ multiplyed by $\frac{5}{7}$ and $\frac{4}{2}$, as by example following And thus is to be vnderstand of all such like.

	2	3
	5	7
40	10	21
$\frac{5}{7}$ $\frac{4}{9}$	4	9 ($\frac{40}{189}$
189	40	189

The 7. Chapter of Diuision in broken numbers.

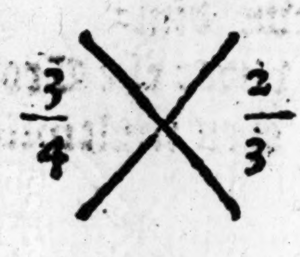
Note that in Diuision of broken numbers, you must sette your deuisor downe firste, nexte vnto the lefte hande, and the deuident or number which is to bee diuided alwayes towarde the right hande. And then multiplie crossewise, that is to say, the numerator of your diuisor, by the denominator of your diuident: and the product shall bee the denominator, which afterwarde shall bee your Deuisor. And

And likewise you muste multiplie the Denominator of your firste number, that is to say, of your Diuisor, by the Numerator of the Diuident, whiche afterward shall bee the Diuident, and that must bee set ouer the Crosse, and the denominator vnder the crosse, then diuide the numerator by the denominator if it may be diuided, if not, you must abbreuiate them, as hereafter by examples shall more plainly appeare.

1 If you will diuide $\frac{3}{4}$ by $\frac{2}{3}$, you must set the diuisor (which is $\frac{2}{3}$) next to the left hande, and the diuident $\frac{3}{4}$ toward your right hand; with a crosse betweene them: as may appeare by this example in ye margent. Then you shall multiplie the numerator of the $\frac{2}{3}$ whiche 2 by the Denominator of the $\frac{3}{4}$ which is 4 and therof commeth 8 which shall be your newe diuisor: set that 8 vnder the Crosse, as the denominator: then multiplie the nu-

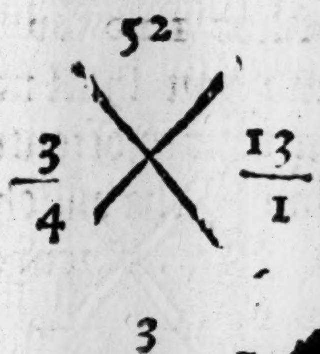
merator

merator of the deuident, that is to say, of the $\frac{3}{4}$, which is 3 by the denominator of the deuisor, that is to witte, of the $\frac{2}{3}$ which is 3, and thereof commeth 9, set the 9 ouer the crosse of the numerator: which shall be nowe the deuident or number to be deuided. Then finally you shall diuide 9 by 8, and thereof commeth into the quotient 1 $\frac{1}{8}$, and so oftentimes is $\frac{2}{3}$ conteyned in $\frac{3}{4}$, as doth appeare before in the margent. But in case you would diuide $\frac{2}{3}$ by $\frac{3}{4}$, you must likewise set your deuisor $\frac{3}{4}$ next to your left hand, as is beforesayde. And then proceede as is aboue declared, and you shall finde that $\frac{2}{3}$ diuided by $\frac{3}{4}$, bringeth into the quotient $\frac{8}{9}$, which cannot bee diuided nor abbreuied, wherefore it appeareth that $\frac{2}{3}$ beeing diuided by $\frac{3}{4}$, bringeth but $\frac{8}{9}$ of one vnitie into the quotient, as doth appeare.



2 Likewise if you will diuide a broken number by a whole number, or else a whole number by a broken, as to diuide $\frac{3}{4}$ by 13, you shall put 1 vnder 3, and it will be $\frac{13}{1}$ for your diuisor, set that towardes your lefte hande, and then multiply 13 by 4, according to the first diuision, and thereof will come 52 for the denominator, set that vnder the crosse, and multiplye 3 by 1, maketh 3 for the numerator, sette that ouer the crosse, and it is $\frac{3}{52}$, as appeareth in the margine.

But if you will diuide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hande, and put one vnder 13, as in the last example, & it is $\frac{13}{1}$, set that toward youre righte hande thus, as appeareth in the Margent, and then worke according to the doctrine of the first diuision, and you



ſhall finde that 13 beeing diuided by $\frac{3}{4}$, bringeth into the quotiente $\frac{52}{3}$, then diuide 52 by 3, and thereof commeth 17 $\frac{1}{3}$, and ſo oftentimes is $\frac{3}{4}$ contayned in 13, as doth appeare.

$\cancel{2}1$
$8\cancel{2}$
$\cancel{3}\cancel{3}$ (17 $\frac{1}{3}$

3. And if you will diuide whole number by whole number and broken, or elſe whole number & broken by whole number, as to diuide 20 by 5 $\frac{5}{6}$, you ſhall reduce 5 $\frac{5}{6}$ into broken by the ſixte reduction, and it maketh $\frac{35}{6}$ for your diuiſor, then put 1 vnder 20, and it wil be $\frac{20}{1}$, then ſhall you multiplye 35 by 1 and 20 by 6, as is taught in the other diuiſions, and you ſhall finde $\frac{120}{35}$: then diuide 120 by 35, and you ſhall finde in your quotiente 3 and $\frac{15}{35}$, the which $\frac{15}{35}$ beeing abbreuyed, is $\frac{3}{7}$, and ſo manye times 5 $\frac{5}{6}$ contained in

120

$\frac{35}{6}$ ✕ $\frac{20}{1}$

35

1
$\cancel{3}5$
$1\cancel{2}\cancel{0}$ (3 $\frac{3}{7}$
$\cancel{3}\cancel{5}$

in 20, as in the margent appeareth.

But if you will diuide $5\frac{5}{6}$ by 20, you shall haue $\frac{35}{120}$, then you must diuide 35 by 120, which you cannot diuide, wherefore you shall abbreuiate $\frac{35}{120}$, and thereof commeth $\frac{7}{24}$ for your quotient.

4. If you will diuide a broken number by whole number and broken, or else whole number and broken, by a broken number. As to diuide $\frac{3}{4}$ by $13\frac{2}{3}$, you must reduce $13\frac{2}{3}$, into his broken by the sixte reduction and they bee $\frac{41}{3}$ for youre Diuisor, then multiplye 41 by 4, and they make 164 for your Denominator, likewise multiply 3 by 3 and they make 9 for the numerator, & then will your summe be, $\frac{9}{164}$, as appeareth in the worke afore noted.

$$\left.\begin{array}{r} 41 \\ 13\frac{2}{3} \end{array}\right|$$

But if you will diuide $13\frac{2}{3}$ by $\frac{3}{4}$, then you must diuide 164 by 9, and you shall

finde 18 $\frac{2}{9}$.

5. If you will diuide whole number and broken, by whole number and broken, as to diuide 7 $\frac{5}{4}$ by 13 $\frac{2}{3}$, you must reduce the whole numbers into their broken, by the doctrine of the first reduction, and you shall finde $\frac{31}{4}$, for the 7 $\frac{3}{4}$, and $\frac{41}{3}$ for the 13 $\frac{2}{3}$: Then sette downe $\frac{41}{3}$ toward the left hand, because it is youre Diuisor, and the $\frac{31}{4}$ towarde the righte hand, and multiply 41 by 4 for your Denominator: and thereof commeth 164. Likewise multiplye 31 by 4 for your numerator, and it amounteth to 39, the whiche diuision will be thus $\frac{93}{164}$, as before dooth appeare.

$$\begin{array}{ccc} & 93 & \\ \frac{41}{3} & \times & \frac{31}{4} \\ & 164 & \end{array}$$

But if you will diuide 13 $\frac{2}{3}$ by 7 $\frac{3}{4}$, you must (contrariwise to the other example) diuide 164 by 93: and you shall finde in the quotient 1 $\frac{71}{93}$.

6. The broken numbers of broken must

muſt be diuided in ſuch maner as broken numbers are, and there is no difference, ſauing only that of diuerſe and many broken numbers you muſt make but two broken numbers, that is to ſay, the one for the diuiſor, and the other for the diuidente, or number that is to be diuided, Example. If you will diuide the $\frac{3}{4}$ of $\frac{3}{5}$, by the $\frac{2}{3}$ of $\frac{4}{7}$, you muſt vnderſtande that for the firſt, the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$ are $\frac{9}{40}$ by the third Reduction, and the $\frac{2}{3}$ of $\frac{4}{7}$ are by the ſame Reduction $\frac{8}{21}$, then haue you $\frac{8}{21}$ for your diuiſor, and $\frac{9}{40}$ for your number to be diuided, then multiplie 8 by 40, whiche maketh 320, ſet that vnder the croſſe, and multiply 9 by 21, and thereof commeth 189: which ſette ouer the croſſe for the Numerator, and they make $\frac{189}{320}$ for this diuiſion, as doth appeare.

$$\begin{array}{ccc} & 189 & \\ \frac{8}{21} & \times & \frac{9}{40} \\ & 320 & \end{array}$$

But if you woulde diuide $\frac{8}{21}$ by $\frac{9}{40}$, you muſt worke contrarye to the laſt

example, that is to say, you must diuide 320, by 189, and therof commeth in the quotient 1 $\frac{131}{189}$.

The eight chapter treateth of Duplation, triplation, and quadruplation of all broken numbers.

If you wil double any broken number, you shall diuide ẏ same by $\frac{1}{2}$, likewise if you wil triple any fraccion, you must diuide it by $\frac{1}{3}$. And for to quadruple any broken number, you shall diuide it by $\frac{1}{4}$, and so is to be vnderstand of all other.

Example of duplation.

If you will double $\frac{3}{8}$ you shall diuide $\frac{3}{8}$ by $\frac{1}{2}$, and thereof commeth $\frac{6}{8}$, whiche being abbreuied, are $\frac{3}{4}$, as by example.

6

$\frac{1}{2}$ ✕ $\frac{3}{8}$

8

Or otherwise, in case the denominator of any fraction be an euen

euen number, you may take halfe the saide denominator, without anye other operation, and the numerator to abide still the numerator vnto the said halfe of the denominator of the Fraction, as by the other example before rehearsed, that is to say of $\frac{3}{8}$, take $\frac{1}{2}$ of 8, which is 4, and that is the denominator, and 3 remaineth still numerator to 4: and it maketh $\frac{3}{4}$, and so of all other, but in case the denominator bee an odde number, that is to say, not euen, then you may multiply the numerator by 2, or else double the numerator, which is all one thing, and the Fraction shall bee doubled. Example, if you will double $\frac{3}{5}$ you must onely multiply the numerator 3 by 2, and they be 6: whiche maketh the fraction to be $\frac{6}{5}$, the whiche 6 being diuided by 5 bringeth 1 $\frac{1}{5}$, and so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you will triple $\frac{3}{5}$ you must diuide $\frac{3}{5}$ by $\frac{1}{3}$ and thereof commeth $\frac{9}{5}$, which

 being

being diuided, bringeth 1 $\frac{4}{5}$, or otherwise, because the denominator is an od number, you may multiplie the numerator 3 by 3, and thereof commeth 9, which maketh $\frac{9}{5}$ as before appeared.

Examples of quadruplation.

If you will quadruple $\frac{4}{5}$ you shall diuide $\frac{4}{5}$ by $\frac{1}{4}$, and thereof commeth $\frac{16}{5}$ which 16 being diuided by 5, bringeth 3 $\frac{1}{5}$, or otherwise, because the denominator of the fraction is an od number, you shall multiplie the Numerator of the $\frac{4}{5}$ that is to say, 4 by 4, and thereof commeth 16, the which diuide by 5, and you shall finde 3 $\frac{1}{5}$ as before. And this suffiseth for duplation, triplation, and quadruplation.

The 9 Chapter treateth of the proofes of broken number. And first of Reduction.

If you doe abbreuiate the broken numbers which be reduced, you shal returne

returne them into the firste estate, as by example, if you reduce $\frac{2}{3}$ with $\frac{4}{5}$, you shall finde $\frac{10}{15}$ and $\frac{12}{15}$, then abbreuiate $\frac{10}{15}$ and you shall find $\frac{2}{3}$, abbreuiat likewise $\frac{12}{15}$ and thereof commeth $\frac{4}{5}$ as before.

The proofe of Abbreuiation.

If you doe multiplie that number which you haue abbreuied by that or those numbers by the whiche you haue abbreuied them, you shall returne them againe into the first estate, Example, if you will abbreuiat $\frac{32}{48}$ by 16, in taking the $\frac{1}{16}$ parte both of the numerator, and also of the denominator, you shall finde $\frac{2}{3}$, the proofe is thus, you must multiplie both the numerator and denominator of $\frac{2}{3}$, that is to say, 3 by 16, maketh 48 for the denominator, and 2 by 16 maketh 32 for the numerator, then set the numerator 32 ouer the denominator 48, and they bee $\frac{32}{48}$ as before.

If

The proofe of Addition.

If you doe ſubſtract one of the numbers, or manye of them (which you haue added) from the totall ſumme, there ſhall remaine the other or others. Example, if you doe adde $\frac{1}{3}$ with $\frac{1}{4}$, you ſhall finde $\frac{7}{12}$. The proofe is, if you ſubſtract $\frac{1}{3}$ from $\frac{7}{12}$, you ſhall finde remaining the other number, which is $\frac{1}{4}$, or elſe if you doe ſubſtract $\frac{1}{4}$ from $\frac{7}{12}$ there will remaine the other number, which is $\frac{1}{3}$.

The proofe of Subſtraction.

If you doe adde that number which remayneth, with the number which you did ſubſtracte, you ſhall finde the totall ſumme, out of the which you made the abatement, or otherwiſe if you adde the two leſſer numbers togeather, you ſhall finde the greater. Example, if you doe ſubſtract $\frac{1}{4}$ from $\frac{1}{3}$ there will remaine $\frac{1}{12}$. The proofe is thus, you muſt adde $\frac{1}{12}$ and $\frac{1}{4}$ together, and you ſhall finde $\frac{16}{48}$, the whiche being abbreuied, dooth make $\frac{1}{3}$, which

is

is the greatest number.

The proofe of Multiplication.

If you diuide the product of the whole multiplication by the multiplycator, you shall finde in your quotient the multiplicant or number the which you haue multiplyed, or else if you diuide the totall summe which is come of the multiplication by the multiplicant, you shall finde in the quotiente the multiplicator. Example, if you multiply $\frac{2}{3}$ by $\frac{4}{5}$, the product of this Multiplication will be $\frac{8}{15}$. The proofe is this: you shall diuide $\frac{8}{15}$ by the Multiplicator $\frac{4}{5}$, and thereof commeth $\frac{2}{3}$, which is the Multiplicant, or else diuide $\frac{8}{15}$ by $\frac{2}{3}$ and you shall finde the $\frac{4}{5}$ which is the multiplicator.

The proofe of Diuision.

If you doe multiplye the quotient by the diuisor, you shall finde the number which you did diuide, that is to say,

your

your Diuident : Example, if you diuide $\frac{2}{3}$ by $\frac{3}{4}$, your quotient will be $\frac{8}{9}$, the proofe is thus, you must multiply $\frac{8}{9}$ by $\frac{3}{4}$, and therof commeth $\frac{24}{36}$, which being abbreuied, are $\frac{2}{3}$, whiche is your diuident, and by this maner, all whole numbers haue their proofes as well as broken numbers.

The tenth Chapter treateth of certaine questions done by broken numbers. And first by Reduction.

Finde two numbers whereof the $\frac{2}{7}$ of the one number, maye bee equall vnto the $\frac{3}{8}$ of the other. Aunswere, you shall reduce $\frac{2}{7}$ and $\frac{3}{8}$ crosse-wise, and you shall finde 16 ouer the $\frac{2}{7}$, and 21, ouer the $\frac{3}{8}$, which are the two numbers that you seeke : for the $\frac{3}{8}$ of 16 are 6, and so are the $\frac{2}{7}$ of 21, likewise 6: wherefore you may perceiue that the $\frac{3}{8}$ of 16 which are 6, are equall vnto the $\frac{2}{7}$ of 21 which is also 6.

2. Find two numbers whereof the $\frac{2}{3}$ of

Baker, H.

$\frac{2}{3}$ of the one, may bee double to the $\frac{1}{4}$ of the other, Answere: double $\frac{1}{4}$, and you shall haue $\frac{2}{4}$, whiche being abbreuied, is $\frac{1}{2}$: then reduce $\frac{2}{3}$ and $\frac{1}{2}$ crossewise, & you shall find 4 ouer the $\frac{2}{3}$, and 3 ouer the $\frac{1}{2}$, which are the two numbers that you seeke. For the $\frac{2}{3}$ of 3, whiche is 2, is double vnto the $\frac{1}{4}$ of 4, which is but 1.

3. Finde two numbers whereof the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one, may bee equall vnto the $\frac{1}{4}$ and the $\frac{1}{5}$ of the other. Auns. Adde the $\frac{1}{3}$ and $\frac{1}{4}$ together, and they make $\frac{7}{12}$, then adde $\frac{1}{4}$ and $\frac{1}{5}$ together, & they are $\frac{9}{20}$: then reduce $\frac{7}{12}$ and $\frac{9}{20}$ crossewise, and you shall haue 140 ouer the $\frac{7}{12}$, and 108 ouer the $\frac{9}{20}$, which are the two numbers that you seeke. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{20}$ of 140.

4. Finde two numbers, whereof the $\frac{1}{2}$ the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one of them, may be equall vnto the $\frac{1}{5}$ the $\frac{1}{6}$ and $\frac{1}{7}$ of the other number. Aunswere: Firste you muste adde $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ togeather, and they make $\frac{13}{12}$, then adde $\frac{1}{5}$, $\frac{1}{6}$, & $\frac{1}{7}$ together,

gether, and they make $\frac{107}{210}$. Then reduce $\frac{13}{12}$ and $\frac{107}{210}$ crossewise, as by the first question of reduction, and you shall finde 2730 ouer the $\frac{13}{12}$, and 1284 ouer the $\frac{107}{210}$, which are the two numbers that you seeke: for 1391 whiche is the $\frac{1}{2}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$, $\frac{1}{6}$ and $\frac{1}{7}$ of 2730, whiche is also 1391.

730.	1284
546	$\frac{1}{2}$ 642
455	$\frac{1}{3}$ 428
390.	$\frac{1}{4}$ 321.
391.	1391
	wants [illegible]

1. Finde three numbers, whereof the $\frac{2}{5}$ of the first, the $\frac{3}{7}$ af the second, and the $\frac{4}{9}$ of the third maye bee equall, the one to the other: Answere, set downe the $\frac{2}{5}$, $\frac{3}{7}$, and $\frac{4}{9}$, and then multiplye the Denominator of the $\frac{2}{5}$, that is to saye 5, by the Numeratours of the other two Fractions, that is to saye, by the numerator of $\frac{3}{7}$, and by the Numerator of $\frac{4}{9}$, which is 3 and 4, and thereof commeth 60 for your firste number: then shall you multiplie the denominator of the $\frac{3}{7}$ whiche is 7, by the Numerators of $\frac{2}{5}$ and $\frac{4}{9}$, that is to saye by 2 and 4, and thereof commeth 56, for the second number. Then multiplye the denominator of $\frac{4}{9}$, that is to saye, 9

by

by the numerator of $\frac{2}{5}$ and $\frac{3}{7}$, that is by 2 and by 3, and thereof commeth 54 for the thirde number, and thus the $\frac{2}{5}$ of 60, which is 24, is likewise the $\frac{3}{7}$ of 56, which is the second number, and is also the $\frac{4}{9}$ of 54, which is the thirde number.

$\frac{24 \mid 2}{60 \mid 5}$. $\frac{24 \mid 3}{56 \mid 7}$. $\frac{24 \mid 4}{54 \mid 9}$.

6. Finde three numbers of whiche the firste and the second may be in such proportion as $\frac{1}{2}$ & $\frac{1}{3}$, and the seconde and thirde in suche proportion as $\frac{1}{4}$ and $\frac{1}{5}$. Answere, Reduce $\frac{1}{2}$ and $\frac{1}{3}$ crossewise, and you shall haue 3 ouer the $\frac{1}{2}$, and 2 ouer the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like maner, and you shall finde 5 ouer the $\frac{1}{4}$, and 4 ouer the $\frac{1}{5}$. Then say by the rule of three, if 5 doe giue me 4, what shall 2 giue me, which is the seconde proportionall, multiplye the seconde number 4 by the third number 2, and thereof commeth 8, the whiche diuide by the first number 5, and thereof commeth 1 $\frac{3}{5}$ for the thirde proportionall: and you shall finde that 3, 2, 1 $\frac{3}{5}$, are the three numbers proportionall which I demaund, or else 15, 10, and 8

in

in whole numbers.

Questions done by addition in Fractions.

WHat number is that, vnto the whiche if you doe adde 13, the whole amounteth to 31: Aunswere, Subtract 13 from 31, and there wil remaine 18, which is the number that you seeke.

2. What number is that vnto the which if you ad $\frac{2}{5}$, the addition will be $\frac{5}{6}$, Aunswere. Abate $\frac{2}{5}$ from $\frac{5}{6}$, & there will remaine $\frac{13}{30}$, which is the number that you desire.

3. What number is that, wherunto if you adde $7\frac{2}{3}$, the whole addition wil be $12\frac{1}{4}$: Answere. Abate $7\frac{2}{3}$ from $12\frac{1}{4}$ & the remaind will be $4\frac{7}{12}$, which is the number that you desire to know.

4. What number is that wherevnto if you adde the $\frac{3}{4}$ of it selfe, that is to saye, of the number that you seeke, the whole Addition may be $\frac{5}{6}$: Aunswer. Here followeth a generall rule

for

for all ſuch like queſtions. Firſt of 3, which is the numerator of $\frac{3}{4}$ make that ſtill the numerator: and likewiſe of 3 and 4 added together, which is both the numerator, and the denominator of the $\frac{3}{4}$, make them your denominator: ſo you ſhall finde $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{5}{6}$ which is $\frac{15}{42}$, or $\frac{5}{14}$, and ſubſtract them from $\frac{5}{6}$, and there will remaine $\frac{10}{21}$, which is the number that you ſeeke.

5. What number is that, vnto the which if you adde his owne $\frac{2}{3}$, that is to ſay $\frac{2}{3}$ of it ſelfe, the whole addition ſhall be 20? Anſwere: do as in the laſt queſtion, of the numerator of $\frac{2}{3}$, that is to ſay, of 2 make ſtill your numerator: and likewiſe of the numerator 2 and ẏ denominator 3, of the $\frac{2}{3}$: make of them both your denominator: and you ſhall find $\frac{2}{5}$, then take the $\frac{2}{5}$ of 20 which are 8, and abate them from 20, and there will remaine 12, which is the number that you deſire. And ſo is to bee done of all ſuch like reaſons.

Questions done by Substraction in Fractions.

WHat number is that, from the which if you doe abate 17, the rest may be 19: Answere, adde 17 and 19 together, and you shall find 36, which is the number that you seeke.

2. What number is that, from the which if you abate $\frac{3}{5}$, the rest may be $\frac{1}{8}$: Answere: adde $\frac{3}{5}$ and $\frac{1}{8}$ together: and you shall finde $\frac{29}{40}$ which is the number that you demaund.

3. What number is that, from the which if you subtract $13\frac{1}{2}$ the rest may be $5\frac{5}{7}$: Answere, adde $13\frac{1}{2}$ and $5\frac{5}{7}$ together, & therof commeth $19\frac{3}{14}$, which is the number that you seeke.

4. What number is that, from the which if you substract his $\frac{2}{5}$, that is to say $\frac{2}{5}$ of it selfe, the rest maye bee 12: Answere: and a rule for such like reasons: that is to say, from the denominator of $\frac{2}{5}$ which is 5 abate 2 whiche is his numerator: and there resteth 3 for the denominator, and thus of $\frac{2}{5}$ you haue now made $\frac{2}{3}$: then take the $\frac{2}{3}$ of

12

12 which are 8 and adde them vnto 12 and thereof commeth 20, for the number which you desire.

5. What number is that from the whiche if you doe abate his $\frac{3}{4}$ the rest maye be $\frac{8}{9}$? Answere, From the denominator of $\frac{3}{4}$ which is 4, substracte his numerator 3 and there resteth 1, thus of $\frac{3}{4}$ you haue made $\frac{3}{1}$? Then multiplie $\frac{3}{1}$ by $\frac{8}{9}$ and thereof commeth 2 $\frac{2}{3}$ the which adde vnto $\frac{8}{9}$, and you shall haue 3 $\frac{5}{8}$, which is the number that you seeke.

6. What number is that, from the which if you abate his $\frac{4}{5}$, the rest may bee 12 $\frac{2}{3}$? Answere. Doe as you did in the last question, and you shall finde that the $\frac{4}{5}$ will be $\frac{4}{1}$. And therefore multiplie 12 $\frac{2}{3}$ by $\frac{4}{1}$, and thereof commeth 50 $\frac{2}{3}$, the which adde vnto 12 $\frac{2}{3}$, and you shall finde 63 $\frac{1}{3}$, for the number that you demaund. And thus of all such like questions.

Question of multiplication in fraction.

VVhat number is that, which being multiplied by 13, the whole product of that multiplication shall make 221? Aunswere: diuide 221 by 13, and thereof commeth 17: which is the number that you seeke.

2. What number is that which being multiplied by 15, the whole multiplication will amount to $\frac{3}{4}$? Answere: diuide $\frac{3}{4}$ by $\frac{15}{1}$, and thereof commeth $\frac{1}{20}$ which is the number that you seeke.

3. What number is that which being multiplied by 21, the whole multiplication will bee $16\frac{4}{5}$? Answere: diuide $16\frac{4}{5}$ by $\frac{21}{1}$, and you shall finde $\frac{4}{5}$ which is the number that you demaund.

4. What number is that which being multiplied by $\frac{3}{4}$, the multiplication will amount to 18? Answere: diuide $\frac{18}{1}$ by $\frac{3}{4}$, and therof commeth 24: which is the number that you desire to know.

5. What number is that which if it

it bee multiplied by $\frac{2}{3}$ the whole multiplication will be $\frac{1}{4}$? Answere, diuide $\frac{1}{4}$ by $\frac{2}{3}$, and the quotient wil be $\frac{3}{8}$, which is the number ÿ you require to knowe.

6. What number is that, which being multiplyed by $\frac{5}{8}$, the product of the multiplycation will bee 16 $\frac{2}{3}$? Aunswere diuide 16 $\frac{2}{3}$ by $\frac{5}{8}$, and thereof commeth 26 $\frac{2}{3}$, which is the number that you seeke.

Here ensueth other necessarie questions which are wrought by multiplication in broken numbers.

I Demaunde how much the $\frac{5}{8}$ of 20. shillings are worth, or what are the $\frac{5}{8}$ of 20 shillings? Answere, you must multiplie $\frac{5}{8}$ by $\frac{20}{1}$ and the product will be $\frac{100}{8}$, therefore diuide 100 by 8, and thereof commeth 12 $\frac{1}{2}$ which is to say, 12 s 6 d. and so much are the $\frac{5}{8}$ of 20 shillings worth.

2 I demaunde what the $\frac{3}{4}$ of $\frac{5}{6}$ of a pounde of money are woorth? that is

to say of 20 s. Answere: Multiply $\frac{3}{4}$ by $\frac{5}{6}$ and thereof commeth $\frac{5}{8}$. Then take the $\frac{5}{8}$ of 20 shillings, as in the last question going before, and you shall find 12 shil. 6 pence, and so much are the $\frac{3}{4}$ of $\frac{5}{6}$ of 20 shillings worth.

3 I demaund what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? Aunswere. Multiplie 8 $\frac{1}{2}$ by $\frac{2}{3}$ or else $\frac{2}{3}$ by 8 $\frac{1}{2}$ which is al one, and you shall find $\frac{34}{6}$. Then diuide 34 by 6, and your Quotient will be fiue pence $\frac{2}{3}$, and so much are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

or 8 $\frac{1}{2}$ — 2

17

3/4 (5 $\frac{2}{3}$

4 What are the $\frac{3}{4}$ of 14 pence $\frac{3}{5}$? Answere: Multiplye 14 $\frac{3}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{219}{20}$, therefore diuide 219 by 20, and your quotient will be 10 pence $\frac{19}{20}$: and so much are the $\frac{3}{4}$ of 14 $\frac{3}{5}$.

5. Howe many quarters or fourth partes are contained in 7 $\frac{2}{3}$? Answere: multiplie 7 $\frac{2}{3}$ by $\frac{4}{1}$ (because one whole containeth foure quarters) and thereof commeth 30 $\frac{2}{3}$, and so many quarters are in the 7 $\frac{2}{3}$, that is to saye 30 quarters, and $\frac{2}{3}$ of a quarter.

6. How

6. Howe many thirdes are in $\frac{3}{4}$ and $\frac{1}{2}$, that is to say in 3 quarters and $\frac{1}{2}$ of one quarter ? which are $\frac{7}{8}$ by the fift reduction. Answere : multiplie $\frac{7}{8}$ by $\frac{3}{1}$ (for because that in one whole are contained 3 thirdes) and thereof commeth $2\frac{5}{8}$ the which $2\frac{5}{8}$ doth signifie $\frac{2}{3}$, and $\frac{5}{8}$ of a thirde : and so many thirds are in $\frac{3}{4}$ and $\frac{1}{8}$ or in $\frac{7}{8}$, which is all one.

Questions done by diuision in broken number.

1. What number is that which being diuided by 17, the quotient will be 13. Answere : Multiplie 17 by 13, and thereof commeth 221, which is ye number that you seeke.

2. What number is that, whiche being diuided by $\frac{3}{4}$, the quotiente will be 21 ? Answere, multiply $\frac{21}{1}$ by $\frac{3}{4}$, and thereof commeth $\frac{63}{4}$, then diuide 63 by 4, and thereof commeth $15\frac{3}{4}$, which is the number that you seeke.

3. What number is that, which being diuided by $\frac{1}{8}$ the Quotiente will

be $\frac{2}{3}$? Answere: multiplie $\frac{2}{3}$ by $\frac{8}{8}$, and thereof commeth $\frac{2}{24}$, which beeing abrenied are $\frac{1}{12}$, for the number which you require.

4. What number is that, whiche being diuided by $\frac{4}{5}$, the quotient will be $16\frac{2}{3}$? Answere: multiplie $16\frac{2}{3}$, by $\frac{4}{5}$, and thereof commeth $\frac{200}{15}$. Therefore diuide 200 by 15. and thereof commeth $13\frac{1}{3}$ which is the number that you desire to finde.

5. What number is that, which being diuided by $13\frac{1}{3}$, the quotient will be 20? Answere: multiply $\frac{20}{1}$ by $13\frac{1}{3}$, and thereof commeth $\frac{800}{3}$, then diuide 800 by 3, and thereof commeth $266\frac{2}{3}$: for the number which you seeke.

6. What number is that, which if it be diuided by $12\frac{1}{2}$, the quotient will be $\frac{7}{8}$? Answere: multiplie $12\frac{1}{2}$, by $\frac{7}{8}$, & thereof commeth $\frac{175}{16}$: then diuide 175 by 16, and thereof commeth $10\frac{15}{16}$: for the number which you desire.

Other

Other necessarie questions done by Diuision in broken number.

I Demaunde what parte 30 is of 70? Answere: diuide 30 by 70, which you cannot, for they are $\frac{30}{73}$, but abreuy them and they are $\frac{3}{7}$. Thus 30 are ye $\frac{3}{7}$ of 70.

2. I demaunde what part 10 is of 16 $\frac{2}{3}$? Answere: diuide $\frac{10}{1}$ by 16 $\frac{2}{3}$ and thereof commeth $\frac{30}{50}$, which being abreuied are $\frac{3}{5}$: and thus 10 is founde to be $\frac{3}{5}$ of 16 $\frac{2}{3}$.

3. More, $\frac{5}{8}$ of one vnitie, what part are they of 25? Answere: diuide $\frac{5}{8}$ by $\frac{25}{1}$, and thereof commeth $\frac{5}{200}$, whiche being abreuied is $\frac{1}{40}$, and thus $\frac{5}{8}$ of 1, is but the $\frac{1}{40}$ of 25.

4. More, $\frac{5}{6}$ what part are they of $\frac{7}{8}$? Answere: diuide $\frac{5}{6}$ by $\frac{7}{8}$, and you shall find $\frac{40}{42}$, which abreuied, are $\frac{20}{21}$.

5 More, $\frac{4}{5}$ of 1, what part are they of 13 $\frac{1}{3}$? Answere: diuide $\frac{4}{5}$ by 13 $\frac{1}{3}$, and you shall finde $\frac{12}{200}$, which being abreuied are $\frac{3}{50}$. And thus $\frac{4}{5}$ of 1, are the $\frac{3}{50}$ of 13 $\frac{1}{3}$.

6. More, 12 $\frac{1}{2}$, what part are they of

30?

30? Answere, Diuide 12 $\frac{1}{2}$ by $\frac{30}{1}$, and you shall find $\frac{25}{60}$, which being abbreuied, are $\frac{5}{12}$, and thus 12 $\frac{1}{2}$ are the $\frac{5}{12}$ of 30.

7 More, 16 $\frac{2}{3}$, what part are they of 57 $\frac{1}{7}$? Answere, diuide 16 $\frac{2}{3}$ by 57 $\frac{1}{7}$, & thereof commeth $\frac{350}{1200}$, which being abreuied are $\frac{7}{24}$, and thus 16 $\frac{2}{3}$ are the $\frac{7}{24}$ of 57 $\frac{1}{7}$.

8. More, $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$, or 3 quarters of $\frac{2}{3}$ ~~of one~~ quarter, what parte are they of 1? Answere, Reduce $\frac{3}{4}$ and the $\frac{2}{3}$ of $\frac{1}{4}$ into a broken number, by the fifte reduction, and you shall finde $\frac{11}{12}$. And thus the $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$ are the $\frac{11}{12}$ of 1 whole.

9. More, of what number are 9 the $\frac{2}{3}$? Answere, diuide 9 by $\frac{2}{3}$, and therof commeth 13 $\frac{1}{2}$, which is the number wherof 9 are the $\frac{2}{3}$.

13. More, of what number are $\frac{2}{5}$ the $\frac{3}{4}$? Answere, diuide $\frac{2}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{8}{15}$: which is the number whereof $\frac{2}{5}$ are the $\frac{3}{4}$ of the same number.

11. More, of what number are 5 $\frac{1}{4}$

the

the $\frac{3}{7}$? Answere: Diuide $5\frac{3}{4}$ by $\frac{3}{7}$, and you shall find $13\frac{5}{12}$, which is the number whereof $5\frac{3}{4}$ are the $\frac{3}{7}$.

12 More, $9\frac{2}{3}$ what part are they of $33\frac{1}{2}$? Answere, Diuide $9\frac{2}{3}$ by $33\frac{1}{2}$, and thereof commeth $\frac{58}{201}$, and thus $9\frac{2}{3}$ are the $\frac{57}{201}$ of $33\frac{1}{2}$ as appeareth.

2

The

The thirde part treateth of certain briefe rules, called rules of practise, with diuerse necessarie questions, profitable not onely for Merchants, but also for other occupiers.

The first Chapter

Some there bee, whiche doe call these rules of practise, briefe rules: for that by them, many questions may bee doone with quicker expedition, then by the rule of three. There bee others whiche call them the small multiplication, for because that the producte, is alwayes lesse in quantitie, than the number whiche is to bee multiplyed. This practise commeth not in vse, but onelye among small kyndes of numbers, whiche haue ouer them, other numbers that are greater. And this being well considered, is no

other

other thing but to conuert leſſer and particular kinds of number, into greater : the which may bee done by the meanes of diuiſion, in taking the halfe, the thirde, the fourth, the fifth, or ſuch other partes of the ſumme, whiche is to be multiplied : as the multiplyer is part of his greater kinde, and that which commeth thereof, is woorth as much (not in quantitie, but in his owne forme and qualitie) as if you did multiplie ſimplie the two ſummes, the one by the other. And for the better vnderſtanding of ſuch conuerſions, you muſte haue reſpecte to one of theſe two conſiderations : the firſt is, when one woulde demaunde this queſtion. At 6 d. the yarde of Cotten, what are 18 yardes woorth by the price? It is manifeſt that they are worth 18 peeces of 6 pence the peece, or 18 halfe ſhillinges, which muſte bee turned into ſhillinges, in taking the halfe of 18 s. and they make 9 s. Or otherwiſe you muſt conſider, that at 1 s. the yarde, the 18 yardes are worth 18 s. wherefore

at

at 6 d. they shall be but halfe so much, for 6 d. is but the $\frac{1}{2}$ of 1 shil. Therefore you must take the $\frac{1}{2}$ of 18 shil. and they make 9 s. which are worth as much as 108 pence, that is to say, as 18 times 6 pence.

First if you will multiplye any number after this maner by pence: whereof the number of the same pence do not extende vnto 12, and thereof to bring shil. into the product, you must know the aliquot parts of 12, which are these that is to say, 6, 4, 3, 2, and 1. For 6 is the $\frac{1}{2}$ of 12, and 4 is the $\frac{1}{3}$ of 12, 3 is the $\frac{1}{4}$, 2 is the $\frac{1}{6}$, and 1 is $\frac{1}{12}$. Then for 6 d. which is the halfe of one shilling, you must take the $\frac{1}{2}$ of all the number which is to bee multiplyed, and that which commeth thereof, shall bee shillinges: if there doe remaine 1, it is 6 pence.

an aliquot part, is any euen part of a shil. or of a pound, or of any other thing as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c. are called aliquot parts

For foure pence you must take the $\frac{1}{3}$ of all the number that is to be multiplied, and if any vnities doe remaine, they shall be thirdes of a shilling, euery one being in value 4 pence.

For

For 3 pence you must take the $\frac{1}{4}$ of al the summe: if anye vnities doe remaine, they shall be fourths of a shilling, euery one being worth 3 pence. For 2 pence you must take the $\frac{1}{6}$ of all the summe, and if any vnities doeth remaine, they shall bee sixe partes of a shilling, being euery one of them worth 2 pence.

For 1 d. take the $\frac{1}{12}$ of the whole summe, if any vnities doe remaine, they are the twelfth parts of a shilling, ech of them being in value one penie, as by these examples following doth plainly appeare.

Example. i.

At 6 pence the yard.
What are 59 yards worth?

29 shil. 6 pence.

ii.

At 4 pence the yard.
What 82 yards?

27 shil. 4 d.

iii.

iii

At 3 pence the yard.
What 97 yardes.

24 shil.3.pence.

iiii

At 2 pence the yard.
What 346 yardes.

57 shil.8 pence.

v

At 1 penie the yard.
What 343 yardes.

28 shil.7 pence.

Here you may see in the first example, that 59 yards at 6 pence the yard, are worth 29 shillings 6 pence, in taking the $\frac{1}{2}$ of 59. And in the second example, the 82 yardes at 4 pence the yard, are worth 27 s.4 d. in taking the $\frac{1}{3}$ of 82.

Like-

Likewise in the thirde example, 97 yardes at 3 pence the yarde bringeth 24 shillings 3 pence, in taking the $\frac{1}{4}$ of 97. Also in the fourth example, 346 yardes at 2 pence the yarde, maketh 57 shillinges 8 pence, in taking the $\frac{1}{6}$ of 346. And finally in the fifte example: 343 yards at 1 d. the yard, amount to 28 shillings 7 pence, in taking the $\frac{1}{12}$ of 343. And so is to bee done of all such like when the number of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12, you must reduce them into some aliquot partes of 12, and after the aforesayd maner you shall make of them two or three products as neede shall require, and adde them together into one summe, as 5 d. may be reduced into 4 d. and 1 penie, or else into 3 d. and 2 d. for 4 d and 1 d do make 5 d, and so do 3 d & 2 d the like, wherefore if you will worke by 4, and by 1, you must for 4 d. take first the $\frac{1}{3}$ of the number that is to be multiplyed, and for 1 penie take the $\frac{1}{12}$ of the whole

summe, or rather for 1 d. you may take the ½ of the product which did come of the 4 d. because that 1 d is the ¼ of 4 d. But if you will worke by 3 pence and 2 pence, you shall take for 3 pence the ¼ of the number which is to be multiplied, and likewise for 2 pence the ⅙ of y same number, adding together both the products. The totall summe of these two numbers shall be the solution to the question: and in like manner is to be done of all others as by these examples following may appeare.

Example.

At 5 pence the yard,
What will 49 yards amount vnto?

16 shil. 4 d.
4 shil. 1 d.

20 shil. 5 d.

ii.

At 7 pence the pound,
What will 54 pound cost?

18 shil. 0 d.
13 shil. 6 d.

31 shil. 6 d.

iii.

At 8 pence the peece,
What are 40 worth?

13 shil. 4 d.
13 shil. 4 d.

26 shil. 8 d.

Other waies.

What are 40 peeces worth?
At 8. d. the peece.

20 shil.
6 shil. 8 d.
26 shil. 8 d.

iiii.

At 9 d. the yard,
What are 73 yards?

36 shil. 6 pence.
18 shil. 3 d.

54 shil. 9 d.

v.

At 10 d the elle,
What are 32 elles?

16 shil. 0.
10 shil. 8.

26 shil. 8 d.

vi.

At 11 d. the lib.
What are 27 lib.

9 shil. 0.
9 shil. 0.
6 shil. 9,

24 shil. 9 d.

Here

Here in this first example, where it is demaunded (at 5 pence the yard) what will 49 yards amount vnto: First for foure d. I take the $\frac{1}{3}$ of 49 shillings, and thereof commeth 15 shil. 4 pence: then for 1 pen. I take the $\frac{1}{4}$ of the same product, that is to say of 16 shil. 4 d. & that bringeth 4 shil. 1 d. these two summes added together doe make 20 s. 5 d. And so much are the 49 yards worth at 5 d. the yard.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole summe which is to be multiplyed, & adde them together, that is to say for 4 d you must take the $\frac{1}{3}$, and for 3 d. the $\frac{1}{4}$: because 4 d is the $\frac{1}{3}$ of 12 d. and 3 d is the $\frac{1}{4}$, as in the second example before doth appeare. Where the question is thus, at 7 d the ℓ, what will 54 ℓ. cost? First for 4 d I take the $\frac{1}{3}$ of 54, & they make 18 s. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 shil. 6 d. Then I adde 18 s and 13 s 6 d. togeather, so both amount to 31 s. 6 d, and so much are the 54 ℓ. at 7 d. the ℓ.

Otherwise, for 7 d you shall take

first the $\frac{1}{2}$ of the whole summe for 6 d. Then for 1 penie you must take the $\frac{1}{6}$ of the same product, and adde them together, so you shall haue the like summe as before.

For 8 pence you must first take $\frac{1}{3}$ of the whole summe for 4 pence, and an other $\frac{1}{3}$ for other 4 pence, and ad them togither, as in the example dooth euidently appeare, where the question is thus: At 8 pence the peece, what are 40 peeces worth? First, for 4 pence I take the $\frac{1}{3}$ of 40, which is 13 shillinges 4 pence. Againe, I take another $\frac{1}{3}$ for the other 4 pence, these two summes being added together, doe make 26 shillings 8 pence: and so much are the 40 peeces worth at 8 pence the peece, as in the third example abouesayde dooth appeare.

Otherwaies, for 8 pence you may take first the $\frac{1}{2}$ of the whole summe for 6 d. Then for 2 pence you shall take the $\frac{1}{3}$ of the product which did come of the sayd $\frac{1}{2}$, and ad them together, so shall you haue likewise the solution of the que-

question. As in the same third exam-
ple of 40 yards, I take first the $\frac{1}{2}$ of 40
for 6 pence, and thereof commeth 20 ß,
then for 2 pence I take the $\frac{1}{3}$ of the said
product, that is to say of 20 shil. which
bringeth 6 ß 8 d, these two summes (20
shil. and 6 ß 8 d) I adde together, and
they make 26 shil. 8 d. as before.

For 9 d. you must take the $\frac{1}{2}$ and the
$\frac{1}{4}$ of the whole summe, and adde them
together: or else for 6 d take first $\frac{1}{2}$ of
the whole summe, then for 3 d take the
$\frac{1}{2}$ of the same product, because 3 d is the
halfe of 6 d, and 6 d added with 3 d
bringeth 9 d, as by the fourth example
where it is demaunded after this sorte,
at 9 d. the yarde, what are 73 yardes
worth? First, for 6 d I take the $\frac{1}{2}$ of 73
and thereof commeth 36 shil. 6 d. Then
for 3, I take $\frac{1}{2}$ of the same 36 shil. 6 d,
which is 18 ß. 3 d. these two summes
I adde together, and they make 54 ß.
9 d. as in the same fourth example is e-
uident.

For 10 d. take first the $\frac{1}{2}$, then the
$\frac{1}{3}$ of the whole sinnme, and adde them

together, and it is done.

For 11 d take first $\frac{1}{3}$ for 4 d, secondly another $\frac{1}{3}$ for other 4 d. and thirdlye $\frac{1}{4}$ for 3 d (of all the whole summe) and ad them together, and that aunswereth the question.

Or else for 11 d, take firste the $\frac{1}{2}$ for 6 d, then the $\frac{1}{3}$ of the whole summe for 4 d, & finally the $\frac{1}{4}$ of the last producte, for 1 d, adding them togeather, and it will be like to the other.

Likewise by the same reason when you will multiplie (by shillings) anye number that is vnder 20 shil. you shall haue in the producte poundes, if you know the aliquot partes of 20, which are these, 10, 5, 4, 2, and 1. For 10 is the $\frac{1}{2}$ of 20, 5 is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$, 2 is the $\frac{1}{10}$, and 1 is the $\frac{1}{20}$.

Then for 10 shil. which is the $\frac{1}{2}$ of a pound, you must take the $\frac{1}{2}$ of the number which is to be multiplied, and you shall haue pounds in the product.

If there doe remaine 1, it shall bee worth 10 shillings.

For

For 5 ſhillings, you muſt take the $\frac{1}{4}$ of the number which is to be multiplyed, and if there do remaine any vnities, they ſhall be fourth parts of a pound, euery vnitie being in value 5 s.

For 4 ſhil. you muſt take the $\frac{1}{5}$ of the number which is to be multiplied: and if there doe remaine any vnities, they be fift parts of a pound, euery vnitie being worth 4 ſhillings.

Example.

At 10 ſhil. the peece.
What are 75 peeces worth?

37 lib. 10 ſhil.

At 5 ſhil. the yard.
What are 89 yards worth.

22 lib. 5 ſhil.

At 4 ſhil. the elle.
What are 93 elles worth?

18 lib. 12 ſhil.

For 2 shillinges you must take the $\frac{1}{10}$ of the number that is to be multiplied. Wherefore if you will take the $\frac{1}{10}$ of any number, you must separate the last figure of the same number (whiche is nearest your righte hande) from all the other figures, with a small strike or dash with a penne. For all the other figures whiche doe remaine toward your left hande from the same figure that you doe separate shall be the sayd $\frac{1}{10}$ of a pound: and that figure so separated toward your right hand shall be so many peeces of two shillinges the peece: the which figure must bee doubled to make therof shillings, as by these examples appeareth.

At 2 shil. the lib.
What are 9|8 lib. worth?

9 lib. 16 shil.

At 2 shil. the dosen,
What are 40|3 dosen worth?

40 lib. 6 shil.

Hereupon

Herevpon dependeth another exacte way for to multiplie by shillinges (if the number of shillings be euen) which is thus, you shall take ½ of the number of the same shillings, and conuert them into peeces of 2 shillings. Then by the number of this halfe you must first multiplie the figure (towards your righte hand) of the number which is to be multiplied, and if there be any tennes in the same product, those must you reserue in your minde, but if (with the same, or else without the same) you doe find any diget number, the same diget number shall you double, and put it in the place of shillings, Then must you proceede to the multiplication of the other figures, adding vnto the product the tens which you before reserued, and thereof shall come pounds.

Now for your better vnderstanding of this which hath bene sayde, and by the way of example, I will propone vnto you this question.

At 8 shillinges the grosse, what are 97 grosse worth after the rate?

First

First in this example, I take halfe the number of shillinges, as before is taught, that is to say, of eight shillings, which is 4 shillings, this 4 shillings I put apart behind a crooked line, righte against 97 towards the left hande, as here you may see, and as hereafter appeareth by diuers examples.

At 8 shil. the grosse,
4) What will 9|7 grosse cost.

3 8 lib. 16 shil.

At 6 shil. the yard.
2) What 9|9 ?

2 9 lib. 14 shil.

At 12 shil.
6) What 34|5.

207. 0 shil.

At 14 shil.
7) What 21|0 ?

147 lib. 0 shil.

Now

Now in the first example, where it is demanded at 8 shil. the grosse, what are 97 grosse: First the ½ of 8 s. which is 4 s. being set apart behind the crooked line, as before is sayd: then I multiply the 97 by 4, sayeng first, 4 times 7 is 28, I double the diget number 8, and that maketh 16, the which 16, I doe put vnder the line in the place of shillings, and I keepe the two tens in my minde, which here in worke doe represent 2 li. Then secondlye I multiply 9 by the sayd 4, and thereof commeth 36, whereunto adde the two li. which before I did reserue, and they make 38. Therefore I put 38 vnder the line in the place of poundes, and the whole summe will be 38 li. 16 shil. Thus much are the 97 grosse worth, at 8 shillings the grosse: the like is to be done of all other. As of 12 s. in multiplieng by 6. Likewise of 6 shil. if you multiply by 3, also of 14, if you multiply by 7. And so of all euen numbers after the same maner.

For 1 shilling you must take the ½ of

of the $\frac{1}{10}$ part of any number, that is to be multiplied.

And if anye thing dse remain, they are shil. Thus by this manner shillings are conuerted into pounds, for it is euen like as though you did diuide them by 20 s. as by this example in the margent doth appeare. Where it is demaunded at 1 s the yard the peece, or any other thing, what are 350 yards or peeces worth.

	At 1 shil.
What	35 | 0.
	17 li. 10 shil.

First I separate ẏ last figure of 350 next to my right hande, whiche is the 0, with a line betweene it, and the fygure 5. Then I make a line vnder the 35 | 0, & I take the $\frac{1}{2}$ of 35, after this maner saieng, the $\frac{1}{2}$ of 3 is 1, and 1 remaineth, which remayne signifieth 10, in that second place: Then I put 1 vnder the line against 3, and I proceede to the rest, saieng the halfe of 15 is 7, (the which 15 came of the 1 that remained, & of the 5 in the first place.) I put 7 vnder the line, right against 5, and

and they make 17 li. The 1 which did last remaine, is 10 s. Now I put 10 s. apart vnder the line, and the whole sum is 17 pounds 10 shillings, so much are 350 worth, at 1 shilling the peece.

But when the number of shillinges is not some aliquot part of 20 shillings, ye must then conuert the same number of shillings into the aliquot parts of 20 and make two or three productes, as neede shall require, the which must be added together after this manner following.

For 3 shillings, you must first take for 2 shillings the $\frac{1}{10}$ of the number that is to be multiplied, then for one shilling you must take the $\frac{1}{2}$ of the producte which did come of the same $\frac{1}{10}$ parte: and adde these two summes together, as doth appeare by this Example following.

At 3 s. the peece of any thing, what shall 641 peeces cost me after the rate: firste, for 2 shillings, I take the $\frac{1}{10}$ of

684, which is 68, in separating the last figure 4, which I must double and they bee 8: I set 8 s. apart

At 3 shil.	
What	11|4.
	81 li. 8 shil.
	34 li. 4 shil.
	102 li. 12 shil.

from the place of poundes, and then I haue 68 pounds 8 shil. for the $\frac{1}{10}$ part, that is to say, for the 2 shil. secondly for 1 li. I take $\frac{1}{2}$ of the product, that is to say, of 68 li. 8 shil. which is 34 li. 4 s. and I put the same vnder the 68 li. 8 shil. Then finallye I ad those two summes together, that is to say, 68 li. 8 shil. and 34 li. 4 shil. so they make 102 li. 10 shil. and so much are the 684 peeces worth, at 3 s. the peece as may appeare in the margent.

For 6 shillings take $\frac{1}{10}$ of the number which is to be multiplied, that is to say take first $\frac{1}{10}$, then double the producte of the same $\frac{1}{10}$, and adde them together Or otherwise, for 4 s. take first the $\frac{1}{5}$ of the number that is to be multiplyed, then for 2 s, take $\frac{1}{2}$ of the producte, &

au-

adde them together.

Or elſe take the 5 ſhillings, the $\frac{1}{4}$ of the whole ſumme, then for 1 ſhilling take the $\frac{1}{5}$ of the product, and adde them together.

Likewiſe for 7 ſhillings, take firſte for 5 ſhillings the $\frac{1}{4}$, then for 2 ſhillings take the $\frac{1}{10}$ of the number which is to be multiplied, and adde them together.

For 8 ſhillings take the $\frac{1}{5}$ at two ſundrie times, that is to ſay, firſt $\frac{1}{5}$ for 4 ſhillings, and then as much more for other 4 ſhillings, and adde them together.

For 9 ſhillinges take the $\frac{1}{4}$, and likewiſe the $\frac{1}{5}$ of the number that is to bee multiplied, and adde them together.

For 11 ſhil. take firſt the $\frac{1}{2}$ for 10 ſhil. Then for 1 ſhil. take the $\frac{1}{10}$ of the product, and ad them together, or elſe for 5 s. take the $\frac{1}{4}$, then for 4 ſhil. take the $\frac{1}{5}$ and laſtly for 2 ſhilling take the $\frac{1}{2}$ of the laſt product, and adde them together.

For 12 ſhil. take firſt the $\frac{1}{2}$ for 10 ſhil. then for 2 ſhillinges take the $\frac{1}{5}$ parte of the product, and adde them together.

For 13 s. take the $\frac{1}{4}$, then the $\frac{1}{5}$, and a-

gaine another $\frac{1}{5}$ of the number which is to be multiplied, and adde the products together, that is to saye: first for 5 shil. take the $\frac{1}{4}$: then for 4 shill. take the $\frac{1}{5}$. And againe another $\frac{1}{5}$ for the other 4 shillings, and adde the three products together, the like is to be done in all others, when the price of the thing which is valued is only of shillings, as by these examples folowing doth plainly appeare.

At 6 shil.

What 67,

13 lib.	8 shil.
6	14
20 lib.	2 shil.

At 7 shil.

What 347?

86	15
34	14
121 lib.	9 shil.

At

At 8 shil.
What 540 ?

108 lib.	0 shil.
180	0
226 lib.	0 shil.

At 9 shil.
What 250 ?

57	10
46	00
103 li.	10 shil.

At 11 shil.
What 159 ?

79	10
7	19
87 lib.	9 shil.

At 12 shil.
What 349 ?

174	10
34	18
209 lib.	8 shil.

At 13 shil.
What 267?

66	15
53	8
52	8
173 lib.	11 shil.

Likewise in multiplieng by pence, you shall haue (at ye first instant) pounds in the product, in case you know the aliquot parts of the $\frac{1}{10}$ of a pounde, or of 24 pence which are these, 12, 8, 6, 4, 3, and 2. For 12 is the $\frac{1}{2}$ of 24, 8 is the $\frac{1}{3}$, 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$, 3 is the $\frac{1}{8}$, and 2 is the $\frac{1}{12}$: but for 12 pence, which is 1 shilling, I haue before made mention thereof.

For 8 pence you must take the $\frac{1}{3}$ of the $\frac{1}{10}$, and the rest which are the peeces of 8 pence, must be doubled to make of them peeces of 4 pence. And of the same number being doubled, you must take the $\frac{1}{3}$ which will be shillings, and if there doe yet remaine any thing, they are thirds of a shilling, being in value 4 pence the peece.

For

For 6 d, take the $\frac{1}{4}$ of the $\frac{1}{10}$; and of that remaineth you must take the $\frac{1}{2}$ which shall be shillings: if there doe yet remaine 1, it shall bee in value 6 pence.

For 4 d you must take the $\frac{1}{6}$ of the $\frac{1}{10}$, and of that which resteth take the $\frac{1}{3}$ to make thereof shillings: if any thing doe yet remaine they are thirdes of a shilling, being in value 4 pence the peece.

For 3 pence take the $\frac{1}{8}$ of the $\frac{1}{10}$ and of that remaineth take the $\frac{1}{4}$ to make of them shillinges: if anye thing doe yet remayne, they are fourths of a shilling, euery one of them being worth 3 pence.

For 2 d. take the $\frac{1}{12}$ of the $\frac{1}{10}$, and of that which resteth take the $\frac{1}{6}$, the which are shillings, if there doe still remaine any thing, they shall be six parts of a shil. euery one being in value 2 d.

For 1 d you shall understand that it is not possible with ease to bring of d. poundes (into the product) upon the totall summe: but first you must bring

them into shillings, by the order of the second rule of this chapter, and then afterward you shall conuert them into pounds, if neede so require, as by these examples following may appeare.

At 8 pence,
What 59|6?

19 lib. 17 shil. 4 d.

At 6 pence,
What 67|8?

16 lib. 19 shil.

At 4 pence
What 93|4?

15 lib. 11 shil. 4 d.

At 3 d.
What 57|1?

7 lib. 2 shil. 9 d.

At 2 pence
What 36|4?

3 lib. 0 shil. 8 d.

At

At 1 d. ½
What 67|6 ¾

5 li. 12 shil. 8 d.

2 li. 16 shil. 4 d.

But if the number of pence bee not an aliquot part of 24 pence. Then must you bring them into the aliquot partes of 24, and make therof diuers products which must be added together, as shall hereafter appeare.

For 5 pence, you shall first take for 3 pence, then for 2 pence, and adde them together, according to the instruction of the last rule. Or else firste, take for 4 pence, and then for 1 penie.

For 7 pence take first for 4 pence, then for 3 d. and adde them together.

For 9 pence firste take for 6 pence, then for 3 pence, adding them together.

For 10 pence take first for 6 pence, then for 4 pence, and ad them together.

For 11 d take first for 8 d, then for 3 pence, and adde them together: as by these examples folowing doth appeare.

At 5 d.
What 92|7?

11,	11,	9.
7,	14,	6.
19 li.	6 shil.	3 d.

At 7 d.
What 51|2?

8,	10,	8,
6,	8,	0.
14 li.	18 shil.	8 d.

At 9 d.
What 54|6?

13,	13,	0.
6,	16,	6.
20 lib.	9 shil.	6 d.

At 10 d.
What 27|3?

6,	16,	6.
4,	11,	0.
11 lib.	7 shi.	6 d.

At 11 d.
What 26|4?

8,	16,	0.
3,	6,	6.
12 lib.	2 ſhil.	0 d.

If you wil multiplie any number by ſhillings and pence, being both togeather, you muſt take firſt foꝛ the ſhil. accoꝛding to the inſtruction of the thirde rule of this firſt chapter, then take foꝛ the pence after the oꝛder of the fift rule, befoꝛe mentioned: but if there be anye aliquot partes of 1 li. conteyning both ſhillinges and pence, then foꝛ thoſe partes you ſhall take ſuch like parte of the number that is to be multiplyed as the number is part of 1 li. the which aliquot parts are theſe, 6 s. 8 d. 3 s. 4 d. 2 s. 6 d: and 1 s. 8 d. For 6 s. 8 d. is y $\frac{1}{3}$ of a li: 3 s. 4 d. is the $\frac{1}{6}$ of li. 2 s. 6 d. is the $\frac{1}{8}$: and 1 ſhil. 8 pence, is the $\frac{1}{12}$ of a li. oꝛ of 20 s. And therefoꝛe foꝛ 6 ſhil. 8 d. you muſt take the $\frac{1}{3}$ of the number that is to bee multiplyed, and if anye thing doe remaine, they are thirdes of

of a pounde, euery one being woorth 6 shillings 8 pence.

For 3 shilling 4 pence you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remayne they are six parts of a pound, euery one being in value 3 shillings 4 pence.

For 2 shillinges 6 pence you must take the $\frac{1}{8}$: if any thing be remaining, they are 8 parts of a pound, each one being worth 2 shillings 6 pence.

For 1 shilling 8 pence, you shall take the $\frac{1}{12}$ of the number that is to be multiplied, and if there doe anye thing remain, they are twelue parts of a pound, euery one being in value 1 shilling 8 d.

At 6 shil. 8 d.

$\frac{1}{3}$ What 647 ?

215 lib. 13 shil. 4 d.

At 3 shil. 4 d.

What 220 ?

36 lib. 13 shil. 4 d.

At

At 2 shil. 6 pence.

What 47?

5 lib. 17 shil. 6 d.

At 1 shil. 8 d.

What 400?

33 lib. 6 shil. 8 d.

Here shall you accustome your selfe to multiplie by all sortes of summes, being composed of shillings and pence, which may come in vse or practise. As thus, for 1 s 1 d, 1 s 2 d, 1 s 3 d, for 1 s 4 d. Likewise for 2 s 1 d, 2 shil. 2 d, 2 s 3 d, 2 s 4 d. And so of all other, considering moreouer manye subtile abbreuiations, which happen oftentimes, that are easie to be conceiued. As thus, at 11 s 3 d, after that I haue taken first the $\frac{1}{2}$ for 10 s. Then for 1 s 3 d I take the $\frac{1}{8}$ of the product, because 1 s 3 d is the $\frac{1}{8}$ of 10 shil. in taking the sayde $\frac{1}{8}$ of the producte. And by this meane, when yee haue taken one product, ye may oftentimes vpon the saine take another more brieflye than vpon the

the summe that is to bee multiplyed, which thing you must foresee.

At 11 shil. 3 d.
What 53?

26,	10,	0.
3,	6,	3.
29 lib.	16 shil.	3 d.

At 6 shil. 3 d.
What 58?

14,	10,	0.
3,	12,	6.
18 lib.	2 shil.	6 d.

At 12 shil. 8 d.
What 64?

32.	0.	0.
6.	8.	0.
2.	2.	8.
40 lib.	10 shil.	8.

But if you will multiplie by pounds, shillings, and pence, being altogether. Firste you must wholye multiplie by pounds,

pounds. Then take for the shillinges and pence, as in the 6 rule of this chapter is plainly declared. And as by Example following may appeare.

At 3 lib. 6 shil. 8 d.
What 49 ?

147	0	0
16	6	8
163 lib.	6 shil.	8 d.

At 5 lib. 18 shil. 4 d.
What 543 ?

2715	0	0
271	10	0
135	15	0
90	10	0
3212 lib.	15 shi.	0 d.

At 2 lib. 7 shil. 4 d.
What 927 ?

1854	0	0
185	8	0
154	10	0
2193 li.	18 shil.	0 d.

So these rules do serue both to buie and sell, as at suche a price the elle, the yard, the peece, the pound weight, or anye other thing: how much is suche a thing, or so many elles worth? Likewise they are very necessarie to conuert all peeces of Golde and Siluer into pounds: for I maye as well saye at 4 shillings 8 pence the French Crowne, what are 135 crownes worth, as to say at 4 shillings 8 pence the yard of cloth, what are 135 yards worth?

When any one of the summes which is to be multiplied, is composed of many denominations, and the other being of one figure alone, then shall ye multiplie all the denominations of the other summe, by the same one figure, beginning firste with that summe which is least in value towards your right hand and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appeare.

At 3 lib, 9 shil, 8 pence the peece,
What 7?

24 lib, 7 shil, 8 d.

But

But if in any of the numbers whiche are to be multiplied, there bee with it a broken number, you must (according to his denominator) take one or manye partes of the other number, as neede doth require, and set the number which commeth thereof vnder the productes, adding the same together, as thus: At 5 li. 7 s 8 d the grosse, what shall 34 grosse ½ cost? Firste you shal multiply 5 li 7 s 8 d, by 34 grosse saieng 5 tymes 34 do make 170 li, then for 6 shilling 8 pence, take the ⅓ of 34, which is 11 pounds 9 s 8 d. Thirdly for 2 shil. take 34 shillings, which is 1 li 14 s. Finally, for the ½ grosse, you must take ½ of the 5 li 7 s 8 d, which is 2 li 13 s 10 pence, and then adde your foure products together, so you shall finde that the 34 grosse ½, at 5 pound 7 shillinges 8 pence

At 5 lib.	7 shil.	8 d.
What 34 ½		
170 lib.	0 shil.	0
11	6	8
1	14	0
2	13	10
125 li.	8 shi.	6 d.

8 pence the grosse is worth 185 li. 14 s. 6 d. as appeareth in the example aforesaid.

And as in this last example, you did for the $\frac{1}{2}$ grosse, take halfe of the price (that one grosse was worth.) And therefore because 1 grosse is worth 5 pound 7 shillings 8 pence, the $\frac{1}{2}$ grosse must be worth halfe so much. So likewise if you haue $\frac{1}{3}$ of a grosse, or of any other thing, you must take the $\frac{1}{3}$ of the price that one grosse is worth, and in like maner for the $\frac{1}{4}$ of any thing you shall take the $\frac{1}{4}$ of the price, also if you haue $\frac{2}{3}$, take the $\frac{2}{3}$ of the price that one is worth, and so of all other fractions, as by these examples following doth appeare.

At 4 lib. 6 shil. 8 d.

What 46 $\frac{1}{2}$.

184	0	0
15	6	8
2	3	4
201 li.	10 shi.	0 d.

At 8 lib. 0 shil. 9 d.
What $54\frac{1}{3}$?

432	0	0
1	7	0
0	13	6
2	13	7

436 li. 14 shil. 1 d.

At 3 lib. 16 shil. 8 d.
What $17\frac{1}{4}$?

3lb. 51.15.0.	51	0	0
4s. 3.9.0	8	10	0
12/8. 10.7.0	5	13	4
8d. 11.6	1	18	4
66.2.6d.	0	19	2

68 li. 00 sh. 10 d.

17.5.0 6.
3. 6.
51.15.0. 3.
5.15.
5.15.
2.17.6
66.2.6 d.

3lb. 51.15.0
10s. 8.12.
5s. 4.6.
20d. 1.8.
66.2d.

12. If you will make the proofe of these rules aforesaide, you must first abate the summe of monie (which the fraction of the multiplication doth import) from the totall summe. And diuide the rest of the poundes of that said totall summe, by the whole multiplicant, the fraction only excepted. And

if anie thing doe remayne after the Diuision is made, that remayne shall be multiplied by 20, and vnto the product of that multiplication, you shall adde the shillinges which remayned of the rest of the totall summe. Againe if any thing doe remaine after the same diuision, you must multiply the same by 12, and vnto the product adde the pence of the totall summe that remained, if any be left: and thus if yee haue trulye wroughte, you shall finde agayne the higher summe of your question, that is to saie, the price that one grosse or any other thing is worth, whereof the question is demaunded.

Or otherwise, reduce the remaine of the totall summe (the value of the monie that the Fraction is worth, being first reduced) all into pence, in multiplieng the pounds by twentie, and the shillings by twelue, adding thereunto the shillings and pence, which are ioyned with the remaine of the said totall summe if any such be, then diuide those pence by the foresaid number that is to

be

be multiplied, the fractions of the same number being also abated. So shal you find the price that one peece, one grosse, or any other thing is valued at. As in the first of the three last examples going before, where the totall summe is 201 pounds 10 shillings, from the which I doe abate the price of the halfe grosse, which is 2 pounds, 3 shillings, 4 pence, the rest is 199 li. 6 s. 8 d. which being reduced into pence, bringeth 47804, I divide the same by 46, and therof commeth 1040 pence. Then I divide that 1040 pence by 12, and they bring 86 shillinges 8 pence, that is to say, 4 li. 6 shillinges and 8 pence, which is the price that one grosse or any other thing did cost, as in the first example doth appeare.

The like is to be done of any manner of thing that is solde by the hundred, after five score to the hundred. As thus, at 12 pounds 7 shillinges 6 pence the 100 poundes weight, what shall 374 pounds weight cost? You shall first multiplie 12 pounds, 7 shillings 6

pence by 3: that is to saye by three hundreth. Then for 50 li. weight you shall take the ½ of 12 li. 7 s. 6 d. because 50 li. is the ½ of 100 li. Likewise for 20 li weighte whiche is the ⅕ of 100 li, you shall take the ⅕ of 12 li. 7 s. 6 d. lastly for 4 li. weight you must take the ⅕ of the last producte.

At 12 li. 7 sh. 6 d			
What 374?			
	37	2	6
	6	3	9
	2	9	6
	0	9	10 ⅘
	46 l.	5 sh.	7 d. ⅘

Thus done, you must adde all these products into one summe, which will make the summe of 46 li. 5 s. 7 d. ⅘, as by this example aboue written doth appeare.

The proofe is made by reducing the totall summe into pence. And to diuide the producte by the number that is to bee multiplied, that is to saye, by 374, likewise diuide the quotient produced of that first Diuision by 12, so shall you finde again the higher summe 12 pound 7 s. 6 d. which is the price of

100 li. weight as before.

Also the like may bee done of our vsuall waight here in England, which is 112 pound, for euery hundred pound waight, in case you know the aliquot parts of a hundred, that is to saye of 112 pound waighte, which are these, 56 li. 28 li. 14 li. and 7 li. For 56 li. is the $\frac{1}{2}$ of 112, 28 li. is the $\frac{1}{4}$ of 112 li. 14 li. is the $\frac{1}{8}$, and 7 li. is the $\frac{1}{16}$.

Therefore, for 56 li. take the $\frac{1}{2}$ of the summe of monie that the 112 pounde waight is worth.

For 28 li. take the $\frac{1}{4}$ of the summe of monie that the 112 li. is worth.

For 14 li. take the $\frac{1}{8}$ of the summe that the C. is worth.

For 7 li. take the $\frac{1}{16}$ of the summe of monie that the C. is worth.

As thus, at 3 li. 6 s. 8 d. the hundred pounds waight, that is to say, the 112 li. What shall 24 hundred 3 quarters 21 li. waight cost after the rate?

First you shall multiplie 24 hundred by 3, which is the 3 li. and thereof will come 72 li. then for 6 s. 8 d. which is

the $\frac{1}{3}$ of 20 shil. you shall take the $\frac{1}{3}$ of 24, which is 8 li: for 24 nobles maketh 8 li. Afterward for the 3 quarters of the C. you shall first for the 56 li. take the $\frac{1}{2}$ of 3 l. 6 s. 8 d. because 56 li. is the $\frac{1}{2}$ of the C. and thereof commeth 1 l. 13 s. 4 d. then for 28 li. which is ẏ quarter of a C, you shall take the $\frac{1}{4}$ of 3 l. 6 s. 8 d. or else the $\frac{1}{2}$ of the product, which commeth last of 56 li. which is 16 s. 8 d. likewise for 14 li. you must take the $\frac{1}{8}$ of 3 li. 6 s. 8 d. which is 8 s. 4 d. or else the $\frac{1}{2}$ of the product that commeth of 28 li. which is all one. Finally, for 7 l. take the $\frac{1}{16}$ of 3 li. 6 s. 8 d, or else the $\frac{1}{2}$ of the last product that commeth of 14 li, and thereof commeth 4 s. 2 d. Then adde al these products together, and the totall sum will bee 83 li. 2 s. 6 d. so much are the

	At 3 lib.	6 shil.	8 d.
What	24 C.	3 qu.	21 li.
	72	0	0
	8	0	0
	1	13	4
		16	8
		8	4
		4	2
	83 lib.	2 shil.	6 d.

the 34 C. 3 quarters, and 21 li. waight worth, after 3 li. 6 s. 8 d. the hundred, as appeareth in the margent.

The proofe hereof is made like to the other proofes aforeſaid, ſauing y^t where in thoſe proofes you abate the price of the monie that the fraction was worth, from the totall ſumme. Here in this example (and in ſuch other like) you muſt abate the price of the monie that the od waight amounteth vnto (ouer & aboue the iuſt hundreth) from the ſaide totall ſumme, the reſt thereof you ſhall conuert into pence, diuiding the product of the multiplication by the iuſt number of the number of the hundreds, ſo ſhall you finde the pence that one hundred is worth, whiche you ſhall bring into pounds by the order of diuiſion, and ſo of all other.

The ſecond chapter treateth of the rule of 3 compound, the which is diſtinct into foure rules, ech of them differing the one from the other.

There belongeth to the firste and second partes of the rule of three compound alwaies 5 numbers: whereof (in the first part of the rule of three composed) the second number and the fift are alwaies of one semblaunce and like denomination, whose rule is thus. You must multiply the first number by the second, and that shall be your diuisor: then multiplye the other three numbers the one by the other to be your diuident.

Example of this firste parte, if 100 Crownes in 12 moneths doe gayne 15 pounds, what will 60 crowns gaine in 8 months? Answere, First multiplie 100 Crownes by 12 moneths, and therof commeth 1200 for your diuisor, then multiply 15 li. by 60 crowns, and by 8 moneths, and you shall haue 7200, wherefore diuide 7200 by 1200 and thereof commeth 6 li. so manye li. will 60 crownes gaine in 8 moneths: this question may be done by the double rule of 3, that is to say by the rule of 3 at 2 times. But yet this rule of 3 composed

Baker, H.

posed is more briefe.

Crowns.	months.	poūds.	crow.	months.
100	12	15	60	8
	1			
	7200			
	1200		(6 li.	

2. In the second parte of the rule of three composed, the thirde number is like vnto the fift, whereof the rule is thus, you must multiply the third number by the fourth, and the producte shall be your diuisor, then multiplie the firste number by the second, and the product thereof by the fift, the which number shal be your diuident, or number that is to be diuided, as by example.

When 60 crownes in 8 moneths doe gaine 6 li. in how many moneths will 100 crownes gaine 15 li. Aunswere, Multiplie the third number 6, by the fourth number 100: and thereof commeth 600: which shall be your diuisor, then multiplie the first number 60 by the second number 8, and the product thereof

thereof by the fift number 15, and thereof will come 7200: then diuide 7200 by 600, and the quotient will be 12, in so many months will 100 crowns gain 15 poundes. This question may likewise be done by the Rule of three at 2 times.

Crowns,	months,	pounds,	crow.	pounds.
60	8	6	100	15

$$\begin{array}{r|l} \cancel{7}\,\cancel{2} & 00 \text{ moneths.} \\ \hline \cancel{6}\,\cancel{6} & 00\ (12 \end{array}$$

In the third part of the Rule of 3 compound, there may be 5 numbers or more, and in this rule the first number and the last are alwaies dissemblantes and of vnlike denomination the one to the other, and the question is from the last number vnto the firste, whereof the rule is thus: you muste multiplie that number which you woulde knowe by those numbers whiche doe giue the vala, and diuide the product of the same by the multiplication of the numbers which

which are alreadie valued, as by example. If 4 Deniers Parisis be worth 5 deniers Tournois, & 10 deniers Tournois be worth 12 deniers of Sauoy, I demaunde how many deniers Parisis are 8 deniers of Sauoy worth? Aunswere. Multiply 8 deniers of Sauoye (which is the number that you woulde knowe) by 4 deniers Parisis, and by 10 deniers Tournois, which are the numbers that giue the value, and they make 320, then multiply 5 de. Tournois by 12 deniers of Sauoy, which are the numbers alreadie valued, & they make 60. Finally, diuide 320 by 60, and you shall find 5 deniers $\frac{1}{3}$ Parisis, so much are the deniers of Sauoy worth.

Parisis,	Tournois,	Tourn.	Sauoy,	Sauoy.
4 d.	5 d.	10 d.	12 d.	8 d.

320. Parisis.

60 (5 d. $\frac{1}{3}$.

In the fourth part of the rule of three compounde, the first number and the last

last are alwaies semblant, and of one denomination, and the question of this rule is alwaies from the last number to the last sauing one. Whereof there is a rule which is thus, You must multiplye that number which you woulde know, by the numbers that are alredie valued, and diuide the producte of the same by the multiplication which commeth of the numbers that giue the value, as by example.

If 4 deniers Parisis, be worth 5 deniers Tournois, and 10 deniers Tournois be worth 12 deniers of Sauoy, I demaund how many deniers of Sauoy are 15 deniers Parisis worth?

Answere, Multiplie 15 deniers Parisis that you would know, by 5 Deniers Tournois, and by 12 Deniers of Sauoy, which are the numbers alreadie valued, and they make 900, diuide the same by 4 times 10, which are the numbers that doe giue the value, that is to say by 40, and you shall finde 22 Deniers $\frac{1}{2}$ of Sauoy: so much are the 16 deniers Parisis worth.

Parisis

Parisis.	Tournois.	Tourn.	Sauoi.	Parisis.
4d.	5d.	10d.	12d.	15d.

$$\begin{array}{r|l} \cancel{1}2 & \\ \cancel{0}\cancel{0} & 0 \text{ Sauoy.} \\ \hline \cancel{4}\cancel{4} & (22\text{d}.\ \tfrac{1}{2}. \end{array}$$

The 3 Chapter treateth of questions of the trade of Merchandise: in the which is taught the rule of three in Fractions, beginning at the fift question following.

If 31 Deuonsh. dosens doe cost mee 100 pounds 15 s. what shal 4 dosens cost after the same rate? Answere, First bring the 100 li. 15 s. all into s. in multipling the 100 li. by 20, and adding to the product the 15 s. and therof commeth 2015 s. then multiplie 2015 by the thirde number 4, and diuide the product by 31, and the quotient will be 260 s. The which diuide againe by 20 and thereof commeth 13 pounds. And so much are the 4 dosens worth.

Dosens

Dosens.	lib.	shil.	Dosens.
31	100.	15	4

20

2015

4

8060

1
28
8060 (260.
3111
33

If 4 dosens bee worth 13 li. What are 31 dosens worth by the price? Answere. Multiply 31 by 13, & therof commeth 403, the which you shall diuide by 4, and thereof commeth 100 li. 3/4, which 3/4 are 15 s. and so much are 32 dosens worth, as before.

Dosens.	lib.	Dosens.
4	13	31

13

93
31

403

403
444 (100 li. 3/4.

3. If 49 elles be worth 2 li. 4 s. 11 d, what are 18 elles worth by the price? First you must bring 2 li. 4 s. 11 d. all into pence, in multiplieng 2 li. by 20 maketh 40, ad therto 4 shil. they make 44 shillings, the which multiplie by 12 pence, and they make 528 d. wherunto adde 11 d. all is 539 d. the which 539 d. must be your second number in the rule of three, then multiplie 539 by the third 18 number, and therof commeth 9702, diuide the same by 49, and you shall haue in your quotient 198 pence, the which diuide by 12, and you shall finde 16 shillings 5 pence, so much are the 18 elles worth.

Elles.	li.	shil.	d.	Elles.
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			538
	44			
	1			
	539			9702

xz

17		1	
4271		76	
886		108	(16 s. 6
9702	(198	122	
4999		1	
44			

4. If 18 elles bee woorth 16 s. 6 d. what are 49 elles worth by the price? Answere, bring 16 shil. 6 d. into pence, in multiplieng 16 by 12: and thereof commeth 198 d. with the 6 d. added to it, then multiply 198 by 49, the product will be 9702. The which diuide by 18 elles, and therof commeth 539 s. Then diuide 539 d. by 12, and the producte thereof by 20. So shall you haue 2 li. 4 shil. 11 d. and so much are the 49 elles worth.

Elles.	shil.	d.	Elles.
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9702

17

x7   1
441   181
9702 (539   880 (44 shil.
1888   122
11   1

Note that wheras in the first part of this booke I haue set foorth the rule of three both in whole numbers, and also in fractions; now I will shew you how to doe the sayd rule of three in fractions more at large. And therefore for that I would haue you to vnderstand the same generally, you must first consider if the three numbers that shall bee proponed (in any question of the said rule of three) be all fractions, yea or no: which if they be all three numbers Fractions: then must you worke as followeth.

First you must multiply the Numerators of the seconde and third Fractions in your rule of three, the one by the other; and againe you must multiplie that product by the Denominator

of the first Fraction: And the number which commeth of this last multiplication shall be your diuident or number that must be diuided.

Secondlye you must multiplye likewise the denominators of the seconde and third Fractions of your saide rule of three the one by the other, and the ofcome, agayne by the numerator of the first fraction, and the number which is produced of that multiplication, shall be your diuisor.

Thirdlye you must diuide the aforesayd diuident by the diuisor, and the quotient will bee the aunswere to the question, as by examples shall hereafter appeare.

But if you find whole numbers and fractions together, in the sayd rule of three, you must first reduce the same in their fractions, by the sixt reduction.

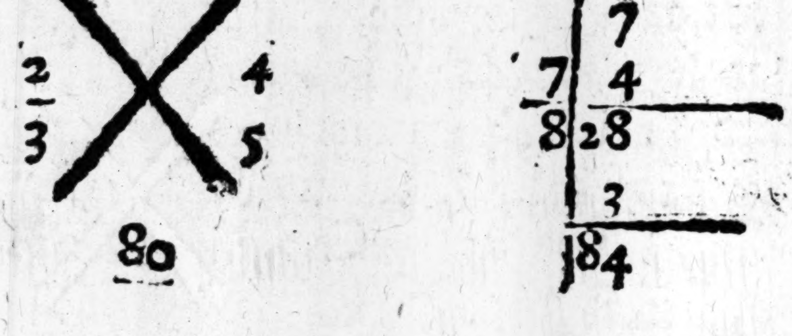
Likewise if you finde any of the

three numbers in your rule of three, to bee whole numbers, alone withoute any fraction ioyned with it, you muſt in this caſe put 1 vnder the ſame whole number, with a line between them both the which 1 dooth repreſent the Denominator to the ſame whole number, and then you muſt proceede to worke the rule of thre in like maner as though they were all Fractions, as before is ſayd.

The Examples of all three differences aforeſayd doe follow in the three next queſtions orderly.

If $\frac{2}{3} \times \frac{4}{5}$ $\frac{7}{8}$: I doe vnderſtande thereby thus as followeth. If $\frac{2}{3}$ of any waight or meaſure, be worth $\frac{4}{5}$ of twentie ſhillings, or of any other ſum, what are $\frac{7}{8}$ of the like waight or meaſure woorth after the rate? Anſwere, Firſt, as is ſayde before, I doe multiplye the Numerators of the ſecond and third Fractions, the one by the other: that is to ſay, 7 by 4, and they make

28: agayne, I doe multiply the ſayd 28 by the denominator of the firſt Fraction, that is to ſaye by 3, and thereof commeth 84, the which 84 I ſet ouer the croſſe for my diuident. Secondlye, I doe multiplie the Denominators of the ſecond and third Fractions, the one by the other, namely 8 by 5, and they make 40, again I doe multiply the ſaid 40 by the numerator of the firſt fraction, that is to ſaye by 2, and thereof commeth 80, the ſame 80 I doe ſet vnder the croſſe for my Diuiſor, then I diuide 84 by 80, and therof commeth in the quotient 1 li. and $\frac{4}{80}$ remayning, the which $\frac{4}{80}$ being abbreuied, maketh $\frac{1}{20}$ of a pound which is worth 12 pence and ſo much will the foreſayde $\frac{7}{8}$ coſt, as by the worke following dooth appeare.



8
5 | 84 (1 4/80
40 | 80
2
80

6. If $\frac{2}{5}$ of an elle of any marchandise doe cost me 12 shil. 7 d. the which 7 d. doth make $\frac{7}{12}$, what will $\frac{9}{10}$ of an elle cost me after the same rate? Answere: First I set downe my numbers as followeth. If $\frac{2}{3} \times 12\frac{7}{12}$. $\frac{9}{10}$. Then by the first reduction I reduce $12\frac{7}{12}$ al into twelfths, and they make $\frac{151}{12}$ for the second number in my rule of three. which must stand in the place of $12\frac{7}{12}$. And then will my three numbers stand thus as followeth, $\frac{2}{5} \times \frac{151}{12}$. $\frac{9}{10}$. Then I multiply 151 by 9, and the ofcome by 5, and thereof commeth 6795, the which I doe set ouer the crosse for my diuident. Likewise I multiplye 12 by 10, and the ofcome by 1, and thereof commeth 240, which I doe set vnder the crosse for my diuisor. Then I deuide 6795, by 240, and there commeth

y^e question is wrought by $\frac{2}{5}$ not by $\frac{2}{3}$.

in the quotient 28 ſhillinges: and 75 remayning, the which 75 becauſe it is the remain of a ſhil. I do multiply it by 12 penies, for that there is 12 pennies in a ſhil. and thereof commeth 900, the ſame 900 I diuide againe by 240, and thereof commeth 3 penies, and 180 remayning, which 180 I doe ſet aparte ouer 240 with a line betweene them both, and they are $\frac{180}{240}$. The which beeing abbreuied, doe make $\frac{3}{4}$ of a pennie. And thus I finde that the $\frac{9}{10}$ of an elle ſhall coſt 28 ſ. 3 d. $\frac{3}{4}$, as hereafter doth appeare.

151	12		6795		
7	12				
1212	24	2		$\frac{151}{12}$	$\frac{9}{10}$
	127	5			
	151				
			240		

151	12	~~1~~~~3~~	
9	10	~~2~~~~0~~7	
1359	120	~~6~~~~7~~~~9~~~~5~~	(28 ſhil.
5	2	~~2~~~~4~~00	
6795	200	~~2~~~~4~~	75

75	1
12	$\cancel{3}8$
150	$\cancel{8}\cancel{0}0$
75	$\cancel{2}\cancel{4}0$
900	

(3 s $\frac{120}{240}$. $\frac{3}{4}$

7. If $\frac{3}{5}$ of an elle doe cost me 8 shillinges, what will 7 elles $\frac{1}{2}$ cost me after the rate? Answere: I doe first reduce the whole number and broken into his broken, by the firt Reduction, that is to saye, 7 $\frac{1}{2}$ into halfes, and they are $\frac{15}{2}$ which must bee the third number in my rule of three, the second number is 8 shillings, but I must (as before is taught) put 1 vnder 8 with a line betweene them, to make it like a fraction, thus, $\frac{8}{1}$. Then must my three numbers in my rule of three, stande after this manner: $\frac{3}{5} \times \frac{8}{1}$. $\frac{15}{2}$. Then I doe multiplie 15 by 8, & the product thereof by 5 amounteth 600: the which I doe set ouer the crosse for my diuident. Likewise I doe multiplie 2 by 1, and the product thereof by 3, and thereof commeth 6, the which I doe set vnder

the crosse for my diuisor. Then I diuide 600 by 6, and I finde in my quotient 100, the which is 100 shillinges, I doe therefore diuide 100 by 20 shil. and my quotient is 5 li. And so much will the 7 elles $\frac{1}{2}$ cost me, as hereafter dooth appeare.

600

$7\frac{1}{2}$ | 7, 2, 14, 1, 5 | $\frac{3}{5}$ X $\frac{8}{1}$ — $\frac{15}{2}$

6

15	2	
8	1	$\cancel{6}\cancel{0}\cancel{0}$ (100 shil. | $1\cancel{0}\cancel{0}$ (5 li.
123	2	$\cancel{6}\cancel{6}\cancel{6}$ | $\cancel{2}\cancel{0}$
5	3	
600	6	

If 1 yard of Veluet cost 19 shillings, what shall $\frac{3}{4}$ of a yarde cost? Answere, set downe your number thus.

If $\frac{1}{1}$ X $\frac{19}{1}$ $\frac{3}{4}$. Then multiplie 1 times 19 by 3: and thereof commeth 57 for

your

your diuident or number to be diuided. The which 57 you shall diuide by 1 times 1, 4 times which are 4, and your quotient will bee 14 shil. $\frac{1}{4}$, which $\frac{1}{4}$ is woorth 3 d. so much are the $\frac{3}{4}$ of a yard worth after 19 shi. the yard, as by practise followeth.

57

$\frac{1}{1}$ 19 3 | 11 57 (14 shil. $\frac{1}{4}$.

1 4 44

4

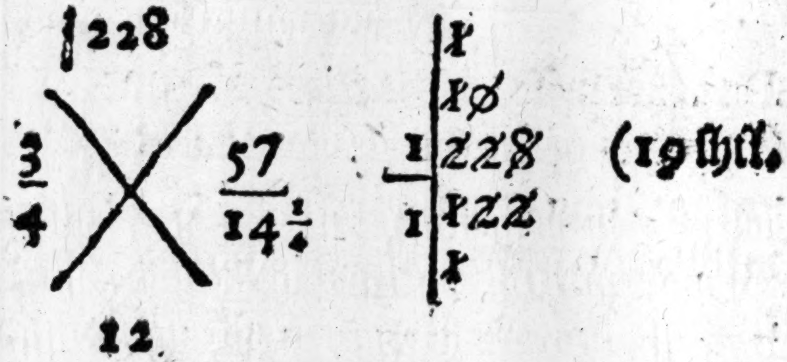
Or otherwise by the rules of practise: first, for $\frac{2}{2}$ of a yarde, which is $\frac{1}{2}$ of a yarde, you must take the $\frac{1}{2}$ of 19 shil. which is 9 s. 6 d. then for $\frac{1}{4}$ of a yarde take the $\frac{1}{2}$ of the product, that is to say of 9 s. 6 d. and thereof commeth 4 s. 9 d. adde these numbers together, and you shall haue 14 s. 3 d. as aboue is said, and as appeareth here in ẏ margent.

19 shil.		
9 shil.	6 d	
4	9 d	
14	3 d	

9. If $\frac{3}{4}$ of a yard

of

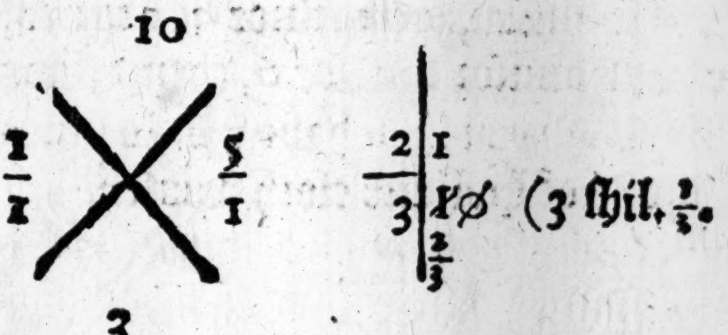
of Veluet doe cost 14 s. 3 d. what shall 1 yard cost? Answere: Set your numbers downe thus: if $\frac{3}{4}$ × 14 $\frac{1}{4}$, $\frac{1}{1}$. Reduce 14 $\frac{1}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiplie 57 by 1, 4 times, and therof commeth 228 for your diuident. Likewise multiplie 1 times 4, 3 times, and therof commeth 12 for your diuisor, then diuide 228 by 12, & your quotient will be 19 shil. so much is the yard of Veluet worth.



Or otherwise by the rule of practise, you shall take the $\frac{1}{3}$ part of 14 shillings 3 pence, which is 4 shillinges 9 pence, and adde it with the same 14 shillinges 3 pence, and you shall haue 19 shillings as before.

14 shil.	3 d.
4	9 d.
19 shil.	0 d.

10. If one elle of Holland cloth bee worth 5 s. what are $\frac{2}{3}$ worth after the rate? Answere: say thus, if $\frac{1}{1}$ × $\frac{5}{1}$, $\frac{2}{3}$, then multiply 2 times 5 one time, and thereof commeth 10 for your diuident, likewise multiply 3 times 1, one time, they make 3 for your diuisor, then diuide 10 by 3, and thereof commeth 3 s. $\frac{1}{3}$, which $\frac{1}{3}$ is worth 4 pence, & so much are the $\frac{2}{3}$ of an elle worth.



Or otherwise by the rule of practise, take first the $\frac{1}{3}$ of 5 s. for the $\frac{1}{3}$ of an elle and that is 1 s. 8 d. Likewise for the other

other $\frac{1}{3}$ of an elle, take againe another $\frac{1}{3}$ of 5 s. which is also 1 shilling 8 pence and adde them together, and so shall you haue 3 s. 4 d. as before.

5 shil.

1	8
1	8
3 shil.	4 d.

11. If $\frac{2}{3}$ of an elle of Holland cloth doe cost me 3 shil. 4 d. what shall 1 elle cost? Answere: set downe your numbers thus, if $\frac{2}{3}$ ✕ $3\frac{1}{3}$ $\frac{1}{1}$. First reduce $3\frac{1}{1}$ all into thirdes, and it will be $\frac{10}{3}$. Then multiplie 1 times 10, 3 times, & thereof commeth 30 for your diuident, likewise multiplye 1 times 3, 2 times, and your diuisor will be 6, then diuide 30 by 6, and you shall haue 5 s. so much is the elle of Holland cloth worth.

30

$\frac{2}{3}$ ✕ $\frac{10}{3\frac{1}{3}}$ $\frac{1}{1}$ $\frac{\cancel{30}}{\cancel{6}}$ (5 shil.

6

Or otherwiſe, by practiſe take the $\frac{1}{2}$ of 3 s. 4 d. which is 1 ſhilling 8 pence and adde it to the ſame 3 s. 4 d. & thereof will come 5 s. as before. For the $\frac{1}{3}$ of 5 s. is as much as the $\frac{1}{2}$ of 3 s. 4 d. which was the price that the $\frac{2}{3}$ of an elle did coſt as appeareth.

3 ſhil.	4 d.
1	8
15 ſhil.	0 d.

12. If one elle coſt me 17 s. what ſhal 15 elles $\frac{1}{8}$ part coſt: which $\frac{1}{8}$ is halfe a quarter of an elle. Aunſ. ſaye if $\frac{1}{1}$ ✕ $\frac{17}{1}$ 15 $\frac{1}{8}$. Firſt reduce 15 $\frac{1}{8}$ into 8 partes, and they make $\frac{121}{8}$, then multiply 121 by 17, one time, and thereof commeth 2057 for your diuident. Likewiſe multiply 8 times 1, 1 time, and the product will be 8 for your diuiſor, then diuide 2057 by 8, and you ſhall finde 257 ſhil. $\frac{1}{8}$, which is 12 li. 17 s. 1 d. $\frac{1}{2}$, & ſo much are the 15 elles $\frac{1}{8}$ worth, as by practiſe doth appeare in the page following.

A

$\frac{1}{1}$ $\frac{17}{1}$ $\frac{121}{15\frac{1}{8}}$

Or otherwise for 10 s. take the $\frac{1}{2}$ of 15, which is 7 li. 10 s. then for 5 s. take the $\frac{1}{2}$ of 7 li. 10 s. which is 3 li. 15 s. thirdly for 2 s. take the $\frac{1}{5}$ of 7 li. 10 s. because the $\frac{1}{5}$ of 10 s. is 2 s. fourthly for ye $\frac{1}{8}$ of the ell, you shall take the $\frac{1}{8}$ of 17 shil. which is 2 shil. 1 pennie, $\frac{1}{2}$ Then ad all these summes together and you shall find 12 li. 17 s. 1 d. $\frac{1}{2}$, as before, and as appeareth more plainlye in the former practise.

15	$\frac{1}{8}$	
17		
7	10	
3	15	0
1	10	0
	2	1 $\frac{1}{2}$
12 li.	17 s.	1 d. $\frac{1}{2}$

13. If 25 elles be worth 2 li. 3 s. 4 d. what are 18 elles $\frac{3}{4}$ worth by the price. Answere, First put 3 shil. 4 d. into the part of a li. and you shall haue $\frac{1}{6}$: then say if $\frac{25}{1}$ giue me 2 li. $\frac{1}{6}$. what shall 18 $\frac{3}{4}$ giue?

$\frac{3}{4}$ giue 4: put the whole numbers into their broken, and then multiplye 1 times 13 by 75, the product will be 975, the which you ſhall diuide by 25 times 6, 4 times, which maketh 600. Then diuide 975 by 600, and youre quotient will be 1 li. and 375 will remaine, the which 375 you ſhall multiplie by 20, and thereof will come 7500 diuide the ſame by 600: your quotient will be 12 s. and 300 will remaine, the which abbreuied is $\frac{1}{2}$ which is 6 pence. thus y 18 elles $\frac{3}{4}$ are worth 1 li. 12 s. 6 d. as by practiſe will appeare.

	13		75
$\frac{25}{1}$	$2\frac{1}{6}$		$18\frac{3}{4}$

Or otherwiſe by the rules of practiſe for becauſe that 12 elles $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 elles, therefore take the $\frac{1}{2}$ of 2 li. 3 s. 4 d. which is 1 li. 1 s. 8 d. then for 6 ells $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 li. 3 s. 4 d. or elſe the $\frac{1}{2}$ of the laſt product (that is to ſay, of 1 li. 1 s. 8 d.) which is all one, and ad them together, ſo ſhall you haue 1 li. 12 s. 6 d. as before.

2

Lib.	shil.	d.
2	3	4
1	1	8
	10	10
1 Lib.	12 shil.	6 d.

14. If 15 yards be worth 32 s. what are halfe a yard and halfe a quarter, or else $\frac{5}{8}$ of a yarde worth, Answere: say if $\frac{15}{1}$ giue $\frac{32}{1}$ what will $\frac{5}{8}$ giue? Multiplie 1 times 32 by 5, and diuide the product by 15 times 8 times, and your quotient will bee 1, and $\frac{40}{120}$ remayning, which is $\frac{1}{3}$ of a shilling, that is to saye 4 d. and so much are the $\frac{5}{8}$ of a yard worth that is to say 1 s. 4 d.

$$\frac{15}{1} \times \frac{32}{1} \qquad \frac{5}{8}$$

Or otherwise, see what the yarde is worth after the maner aforesayd in the other Examples, and you shall finde that the yard is worth 2 shil. 1 d. $\frac{3}{5}$, of the which number take firste the $\frac{1}{2}$ for $\frac{4}{8}$ which is 1 shil. 0 d. $\frac{4}{5}$, of the whiche number, take the $\frac{1}{4}$ for the other $\frac{1}{8}$, which

which is 3 d. $\frac{1}{5}$, adde these two numbers together, and you shall find the $\frac{5}{8}$ to bee woorth 1 s: 4 d. as before is said.

2. shil.	1 d.	$\frac{5}{5}$.
1	0	$\frac{4}{5}$.
	3	$\frac{1}{5}$.
1 shil.	4 d.	0

14. If 13 elles $\frac{5}{6}$ be woorth 27 shil. what are 10 elles $\frac{2}{3}$ worth by the price? Answere: say if 13 $\frac{5}{6}$ giue $\frac{27}{1}$, what shall 10 $\frac{2}{3}$ giue? put the whole numbers into their broken, and you shall finde $\frac{82}{6}$, $\frac{27}{1}$, and $\frac{32}{3}$. Then multiplie 6 times 27, by 32, and thereof commeth 5184, the which number you shall diuide by 83 times 1, 3, times, and you shall finde 20 shil. $\frac{68}{83}$, which fraction is worth 8 d. $\frac{69}{83}$ parts of a pennie.

$$\frac{83}{13\frac{5}{9}} \times \frac{27}{1} \qquad \frac{32}{10\frac{2}{3}}$$

16. If 2 yards $\frac{1}{2}$ be woorth 4 s. 8 d, what are 8 yardes $\frac{1}{4}$ woorth? Answere,

put the 8 d. into the parte of a shilling, setting 8 ouer 12, & it will be $\frac{8}{12}$, which abbreuied, are $\frac{2}{3}$, then reduce the whole numbers into three broken, and they will stand thus, $\frac{5}{2}$, $\frac{14}{3}$, $\frac{33}{4}$, then multiply 2 times 14 by 33, and diuide the product by 5 tymes 3, 4 times: and you shall finde 15 s, and $\frac{24}{60}$ will remaine, which are worth 4 d. $\frac{4}{5}$, so much are the 8 yeardes $\frac{1}{4}$ worth.

" or $\frac{2}{5}$ d.

$$\frac{5}{2\frac{1}{2}} \times \frac{14}{4\frac{2}{3}} \qquad \frac{33}{8\frac{1}{4}}$$

¶ 17 If 1 kersey be worth 2 li. 6 s. 8 d. howe manie kerseys shall I buy for 36 li. 3 s. 4 d, after the rate? Answere, put 6 s. 8 d. into the part of a li. and you shall haue 2 li. $\frac{1}{3}$, for the first number in the rule of 3, and 1 kersey for the seconde number: then put 3 s. 4 d. into the part of a li. and it is $\frac{1}{6}$, so you shall haue 36 li. $\frac{1}{6}$ for the third number, then will your 3 numbers in the rule of 3, stande thus. $2\frac{1}{3} \times \frac{1}{2}$. $36\frac{1}{6}$. Then reduce the whole numbers into their broken

broken, & it will be thus, $\frac{7}{3}$ $\frac{1}{1}$ $\frac{217}{6}$.
Then multiplie 3 times 1 by 217 and thereof will come 651 for your diuidend. Likewise multiplie 7 times 1, by 6: and the product thereof will be 42. Then diuide 651, by 42. and you shall finde 15 $\frac{1}{2}$. So many kerseys of 2 li. 6 s. 8 d. the peece, shall you haue for 36 li. 3 s. 4 d.

$$\frac{7}{2\frac{1}{3}} \times \frac{7}{3} \qquad \frac{217}{36\frac{1}{6}}.$$

The 4 Chapter treateth of losse and gaines, in the trade of Marchandice.

1 IF 13 yards $\frac{1}{3}$ be worth 22 pound 10 s. how shall I sell one yard, to gaine $\frac{1}{3}$, or to make of 3, 4, which is all one. Answere, say by the rule of three if 3 doe yeelde 4, what will 22 $\frac{1}{2}$ yeelde, multiplie and diuide, & you shall find 30 li. Then say againe by the rule of three if 13 yardes $\frac{1}{3}$ do giue 30 pound, as wel of principall as of gaine: what will

1 yarde bee woorth by the price? Multiplie and diuide, and you shall finde 2 li. 5 s. and for that price must the yarde bee solde to gaine the $\frac{1}{3}$, or to make of 3, 4.

$$\frac{180}{\frac{3}{1} \times \frac{4}{1} \quad 6}$$

45 | ~~180~~

$22\frac{1}{2}$ | ~~88~~ (30.

$$\frac{90}{40}$$

$13\frac{1}{3} \times \frac{10}{1}$ $\frac{1}{10}$.

40

Or otherwise, take the $\frac{1}{3}$ part of 22 li. 10 s. which is 7 li. 13 s. that shall you adde with 22 li. 10 s. and you shall haue 30 li. as before. Then diuide 30 by 13 $\frac{1}{3}$, and you shall finde 2 li. 5 s. as aboue is saide.

li.	shil.
22	10
7	10
30	00

2. If 1 yarde bee woorth 27 s. 6 d.

for

for how much ſhall 16 yardes $\frac{2}{3}$ be ſolde to gaine 2 s. vpon the pound of money? that is to ſay, vpon 20 s? Anſwere, adde 2 s, unto 20, and you ſhall haue 22, then ſay, if 20 s. principall, doe giue 22 s. principall, and gaine: howe much will 27 s 6 d. principall yeeld? Multiply and diuide, and you ſhall finde 30 s. $\frac{1}{4}$: then ſay againe by the rule of three. If 1 yarde doe giue me 30 s. $\frac{1}{4}$ (which is as well the principall as the gaine) what ſhall 16 yards $\frac{2}{3}$ giue mee? Multiply and diuide, and you ſhall finde 25 li. 4 s. 2 d. For the ſame price ſhall the 16 yardes $\frac{2}{3}$ bee ſolde to gaine after the rate of 2 s. vppon the pound of money, or vpon 20 s. which is all one.

$$\frac{20}{1} \times \frac{22}{1} \quad \overline{}\,55 \;|\; 27\tfrac{1}{2} \;| \qquad \frac{1}{1} \times \overset{121}{34\tfrac{1}{4}} \qquad \overset{50}{16\tfrac{2}{3}}$$

3. If 10 yardes $\frac{2}{3}$ be woorth 25 li. 10 s. for howe much ſhall 2 yardes $\frac{1}{4}$ bee ſold, to gaine after 10 li. vpon the 100 li. of money, Anſwere: ſay if 100 principall yeeld 110, as well principall as

gaine, howe much will 25 pound, 10 s. yeeld me: multiply and diuide, and you shall find 28 pound 1 s. Then say if 10 yards $\frac{2}{3}$ doe yeeld me 28 li. 1 s, as well principall as gaine, howe much shall 2 $\frac{1}{4}$ yeeld me? Multiplie and diuide, and you shall find 5 pound 18 s. 4 d. $\frac{1}{125}$ and for so much shall the 2 yards $\frac{1}{4}$ be solde, to gaine after 10 li. vpon the 100 pound of money.

querey y be if $\frac{1}{12}$ d. be not $\frac{1}{32}$ d.

$$\frac{100}{1} \text{---}|\text{---} \frac{110}{1} \qquad \frac{51}{25\frac{1}{2}}$$

$$\frac{32}{10\frac{2}{3}} \qquad \frac{561}{28\frac{1}{20}} \qquad \frac{9}{2\frac{1}{4}}$$

And although that in these questions of gaine and losse, sometimes the firste number is not like vnto the third number, that is to say of the same denomination, for whereas one woulde say, if 20 shi. gaine 2 shil. what shall 50 pound gaine? or what shall 25 pound gain, &c. Or if 20 li. do gaine 2 pound, what shall 25 shil. gaine? or what shall 27 shil. $\frac{1}{2}$ gaine

gaine ? Yet the same doth not prooue that the rule is therefore false. For if 20 s. doe gaine 2 s. 20 li. shall gaine 2 li. & 20 d. shall gaine 2 d. Likewise 20 Crownes, shall gaine 2 Crownes : and so of all other. Therefore it is to bee vnderstande, that the firste number of the rule of three in these reasons, is purposed to be semblable of like to the thirde, in qualitie or name.

When one Marchant selleth wares to another, and hee giueth to the buyer 2 vppon 15 : how much shall the buyer gaine vpon the 100, after the rate ? Answere, first add 2 vnto 15, & they are 17 then say if 15 giue 17, what shall 100 giue? Multiplie & diuide, and you shall finde 113 $\frac{1}{3}$, so the buyer getteth after the rate of 13 $\frac{1}{3}$ vpon the 100.

15. | 17. | 100.

4. If one northren dosen cost me 3 li. 5 s. I sell the same againe for 3 li. 12 s. 6 d. howe much doe I gaine vppon the pound of money after the rate. Answere

say if 3 li. $\frac{1}{4}$ doe giue 3 li. $\frac{5}{8}$ what shall $\frac{20}{1}$ giue? put the whole number into their broken & you shall haue $\frac{13}{4}$ $\frac{29}{8}$ $\frac{20}{1}$ then multiply 4 times 29, by 20, and thereof commeth 2320: for your number that is to be diuided, likewise multiplie 13 times 8, 1 time: and thereof commeth 104, Then diuide 2320. by 104, and you shall finde 22 s. $\frac{4}{13}$. So I shall get 2 s: $\frac{4}{13}$ vpon 20 s, or vppon the pound of money.

$\frac{4}{13}$ s. or 3 $\frac{9}{13}$ d.

$$\frac{13}{3\frac{1}{4}} \times \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}$$

5. If a yearde of cloth cost me 7 s. 8 d and afterwarde I sell of the same cloth 13 yards $\frac{1}{4}$, for 4 li. 13 s. 4 d. I would know whether I doe winne or lose, and howe much vpon the 100 li. of money? Answere: see first at 7 s. 8 d. the yarde, what the 13 yardes $\frac{1}{4}$ shall cost, and you shall finde 5 li. 1 s. 7 d. And I sold the same but for 4 li. 13 s. 4 s. so that I doe lose vpon the 13 yards $\frac{1}{4}$, ẏ summe of 8 s. 3 d. Then if you will knowe how much

muche is loste in the 100: say by the rule of three, if 5 li. 1 s. 7 d. do lose 8 s. 3 d, what will 100 li. lose? First, put 1 s. 7 d. into the part of a li. and it will bee $\frac{19}{240}$. Likewise put 8 s. 3 d. into the part of a li. & it is $\frac{33}{80}$. Then will your numbers stand thus: $5\frac{19}{240} \times \frac{33}{80}$ $\frac{100}{1}$ reduce the whole into his broken, and then multiplie and diuide, so you shall find 8 li. $\frac{2184}{9752}$, which fraction is worth 2 shil. 5 d. $\frac{169}{1219}$ and so much is lost in the 100 li. of money.

$$\frac{1219.}{5\frac{19}{240} \times \frac{33}{80}} \qquad \frac{100}{1}$$

6. More, if 12 yards $\frac{1}{2}$ of scarlet, bee solde for 30 li. 15 s. vppon the whiche is gained after the rate of 11 $\frac{1}{9}$ vppon the 100: I demaunde what the yarde did cost at the first? Answere: from 30 li. 15 s. subtract his $\frac{1}{10}$ parte, which is 3 li. 1 s. 6 d. and there resteth 27 li. 13 s. 6 d. the whiche number multiplyed by 2, bringeth 55 li. 7 s. of the which number take the $\frac{1}{5}$, which is 11 li. 1 s. and

2t Rule 6
1/0 lb.

19s. 1 $\frac{3}{5}$ d —— 11 lb. 2s. 2d $\frac{2}{3}$ —— and 17s. 2d $\frac{16}{25}$.

1. 300 / 287 1. —— 5. 100 / 9 1. —— 2. 874 83 66 / 6000 30 1 fare 10.

and 4 d. & $\frac{4}{5}$. Then take againe the $\frac{1}{5}$ of the sayde 11 pounde. 1 shilling 4 d. $\frac{4}{5}$ which is 2 li. 4 shillinges three pence, $\frac{9}{25}$. And so much did the yarde cost, at the first penie.

30 lib.	15 shil.	0 d.
3	1	6
27	13	6
2	0	0
55	7	0
11	1	4 $\frac{4}{5}$
2 lib.	4 shil.	3 d. $\frac{9}{25}$.

7. More, If 15 yardes $\frac{3}{4}$ of Scarlet, did cost me 32 li. 13 s. 4 d. And I sell the yarde againe for 2 li. whether doe I winne or lose, or how much in or vpon the pound of money.

Answere: looke what the 15 yardes $\frac{3}{4}$ are woorth at 2 li. the yarde, and you shall find that they are worth 31 pound 10 s. But they did cost 32 li. 13 s. 4 d. so that there is lost vppon the whole, 1 li. 3 s. 4 d. Then to knowe howe much

much is lost in the pound, say by ẏ rule of three, if 32 li $\frac{2}{3}$ doe lose 1 li. $\frac{1}{6}$, what will $\frac{1}{1}$ lose, that is to say what will 1 li. lose? reduce the whole numbers into their broken, then multiplie 1, and diuide, so shall you find $\frac{21}{588}$ parts of a li. Then multiplie 21 by 240 d. because so many pence are in a pound, and diuide the product by 588, and you shall finde 8 d. $\frac{336}{588}$, which being abreuied do make $\frac{4}{7}$, and thus you see that 8 d. $\frac{4}{7}$ is lost in the pound of money.

$$\frac{98}{32\frac{2}{3}} \qquad \frac{7}{1\frac{1}{7}} \qquad \frac{1}{1}$$

8 If 1 yard of cloth of Tissue be solde for 3 pounde 15 s. whereupon is loste after the rate of 10 s. vpon the 100, I demaund what 12 yardes $\frac{1}{2}$ of the same tissue did cost? Answere, adde vnto 3 li. 15 s. his owne $\frac{1}{10}$ part, which is 7 s. 6 d. and all amounteth to 4 li. 2 shil. 6 d. then looke what the 12 yardes $\frac{1}{2}$ will amount vnto after 4 pounde 2 shil. 6 d. and you shall finde that they will come

to

to 51 li. 11 s. 3 d. so much did the 12 yards ½ cost.

	12. ½
3 li. 15 shil. 0 d.	4 lib. 2 shil. 6 d.
7 6	48 00 0
4 lib. 2 shil. 6 d.	1 10 0
	2 01 3
	51 lib. 11 shil. 3 d.

9. More, if I sell one Wilshire white for 6 li. 12 s. whereupon I doe gayne after the rate of 2 s. upon the li. of money: that is to say, uppon 20 s. I demaunde what 11 peeces of the same whites did cost mee? Answere: from 6 li. 12 s. (which is 132 s.) you shall substract his $\frac{1}{11}$ part, that is to say, 12 s. and there will remaine 120 s. or 6 li. Then see at 6 li. the cloth, what the 11 clothes are woorth, and you shall finde that they are woorth 66 li. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 li.

10. If I sell 10 elles $\frac{1}{2}$ of Hollande for 22 s. 6 d. wherevpon I doe lose after the rate of 2 s. in the li. of money. I demaunde what the elle did cost me? Answere: say by the rule of three, if 18 giue 20 s. what will 22 s. 6 d giue? Multiplie and deuide, and you shall finde 25 s. Then deuide 25 s. by 10 $\frac{1}{2}$: and thereof commeth 2 s. 4 d. $\frac{4}{7}$. So much did the elle cost.

$\frac{18}{1} \times \frac{20}{1}$ 22 $\frac{1}{2}$.

11. If I sell one cloth for 5 li. where vpon I doe lose after 10 in the 100, I demaunde howe much I shoulde lose or gaine in the 100, if in case I had sold the same for 5 pound, 10 shil? Answere: say, if 90 yeeld 100, howe much will 5 li. giue? Multiply & deuide & you shall finde 5 li. $\frac{5}{9}$. Then say againe by ye rule of three, if $\frac{5}{9}$ come to 5 $\frac{1}{2}$, what will 100 come to? Multiply & deuide, & you shall finde 99 pound. which being subtracted from 100, there will remaine 1 li: & so much is lost in the 100

The

The 5 Chapter treateth of lengths and bredths of Tapistrie and other clothes.

1. If a peece of Tapestrie be 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{2}{3}$ in breadth, howe many elles square doth the same peece conteine. Aunswere: Multiplie the length by the breadth, that is to say, 5 $\frac{3}{4}$, by 4 $\frac{2}{3}$, and thereof will come 26 elles, $\frac{5}{6}$. So many elles square doth the same peece conteine.

2 More, if a peece of Tapistrie do containe 32 elles square, and the same being in length 6 elles $\frac{1}{4}$, I demaunde howe many elles in breadth the same peece doth conteine. Answere, diuide 32 elles by 6 $\frac{1}{4}$, and there of commeth 5 $\frac{3}{25}$. So many elles doth the same peece containe.

3. More, a peece of cloth being 13 yardes $\frac{1}{3}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in breadth, how many yards of $\frac{2}{3}$ and $\frac{1}{2}$ of one thirde broade, will the

$\frac{2}{3}$ 3 2
2 . 1
$\frac{5}{6}$

same

same peece make? Aunswere: see first by the 5 reduction what part of a yard the $\frac{5}{4}$ and $\frac{1}{2}$ quarter bee, and you shall finde that they make $\frac{11}{8}$, which is 1 yarde $\frac{3}{8}$. Then multiplie 13 yardes $\frac{1}{3}$ by 1 yard $\frac{3}{8}$, & you shall haue 18 yardes $\frac{1}{3}$ in square, the which you must diuide by $\frac{2}{3}$ & $\frac{1}{2}$ being reduced into one fraction by the fift reduction: that is to say, by $\frac{5}{6}$ (because that $\frac{2}{3}$, $\frac{1}{2}$ beeing brought into one fraction maketh $\frac{5}{6}$) and you shall finde 22 yardes. So many yards of $\frac{2}{3}$ and $\frac{1}{2}$ broade doth the same peece conteine.

4. More, a Marchant hath bought 4 yardes $\frac{2}{3}$ of clothe, beeing sixe quarters and a halfe one quarter broade, to make him a gowne, the which hee will line throw-out, with blacke Say of $\frac{3}{4}$ of a yarde broade. I demaunde how much Say hee must buy? Answer. Multiplie the length of the cloth, by the breadth, that is to say $4\frac{2}{3}$, by $1\frac{5}{8}$, (which is the sixe quarters $\frac{1}{2}$ of a quarter) and therof commeth 7 yardes $\frac{7}{12}$, the which diuide

$4\frac{2}{3}$ $1\frac{5}{8}$.

$\frac{14}{3}$ $\frac{13}{8}$

uide by $\frac{3}{4}$, and you shall finde 10 yards $\frac{8}{9}$. So manie yardes of Say must hee haue to line the same 4 yards $\frac{2}{3}$ of cloth, beeing of 6 quarters and $\frac{1}{2}$ a quarter broade.

5. More, at 6 s. 8 d. the elle square, what shall a peece of Tapistrie coste mee, which is 5 elles $\frac{1}{2}$ long, and 4 elles $\frac{1}{4}$ broade? Answere: Multiplie 5 $\frac{1}{2}$, by 4 $\frac{1}{4}$, & thereof commeth 23 elles $\frac{3}{8}$ square: then say by the rule of three, if 1 elle square cost me 6 s. 8 d. what shall 23 $\frac{3}{8}$ elles cost? Multiplie and diuide, & you shall finde 7 li. 15 s. 10 d. so much the said peece of Tapistrie did cost.

Or otherwise, by the rules of practise: take the $\frac{1}{3}$ of 23 $\frac{3}{8}$: and you shall find 7 li. 15 s 10 d: as aboue is saide.

6. More, a peece of Hollande cloath conteining 42 elles $\frac{2}{3}$ Flemmish, how many elles Englishe doe they make? Heere you must first note, that 100 elles Flemmish, doe make but 60 elles Englishe, and so consequentlye, 5 elles Flemmish, doe make but 3 elles

Englisth

English. Therefore say by the rule of three, if 5 elles Flemish doe make 3 el English, howe many elles Englishe will 42 elles $\frac{2}{3}$ Flemish make? Multiplie and diuide, and you shall finde 25 elles $\frac{3}{5}$ English, and so many elles Englishe dooth 42 elles $\frac{2}{3}$ Flemishe containe, the like is to bee done of all others.

7 More, I haue bought a peece of Tapistrie, being 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{2}{3}$ broade of Flaunders measure, I demaunde howe manie elles square it maketh Englishe measure? Answere: First, forasmuch as 3 elles English are woorth 5 elles Flemish, therefore put three elles English into his square, in multiplying 3 by it selfe, which maketh 9: likewise multiplie 5, in it selfe squarely, and it will be 25. Then multiplie 5 $\frac{3}{4}$, which is ẏ length of ẏ peece, by 4 $\frac{2}{3}$, which is the breadth and therof commeth 26 elles $\frac{5}{6}$ square: then say by the rule of three, if 25 elles square of Flemish measure bee woorth

9 elles ſquare of Engliſhe meaſure, what are 26 elles $\frac{5}{6}$ Flemiſh woorth? multiplie and diuide, and you ſhall find that they are woorth 9 elles $\frac{33}{50}$ ſquare of Engliſh meaſure.

8 More, at 3 s. 6 d. the elle Flemiſh, what is the Engliſh elle woorth after the rate? Anſwere: Firſt ſay, if 5 elles Flemiſh bee woorth 3 elles Engliſh, what is 1 elle Flemiſh woorth? Multiplie and diuide, and you ſhall find $\frac{3}{5}$ of an Engliſh elle. Then ſay againe by the rule of three, if $\frac{3}{5}$ of an Engliſhe elle be woorth 3 s. 6 d. what is 1 Engliſh elle woorth: multiplie and diuide, and you ſhall finde 5 s. 10 d. ſo much ſhal the Engliſh elle be worth.

9 More, at 6 s. 8 d. the Flemiſh elle ſquare, what is the Engliſh ell worth? Anſwere, ſay by the foreſayde reaſon, if 25 elles Flemiſh ſquare, be woorth 9 elles ſquare Engliſh, what is one elle ſquare Flemiſh woorth? Multiplie and diuide, and you ſhal finde $\frac{9}{25}$ of a ſquare Eng-

English elle. Then say, if $\frac{9}{25}$ of an English elle be woorth 6 s. 8 d. what is 1 square elle English woorth? multiply and diuide, and you shall finde 18 s. 6 d. $\frac{2}{9}$, so much shall one English elle square be woorth.

The 6 Chapter treateth of the reducing of the Pawnes of Geanes into English yardes.

Note that 100 pawnes doe make 26 yards, and 1 pawne is $\frac{13}{50}$ of a yard after the same rate, and 3 pawnes $\frac{11}{13}$ do make 1 yard.

Example.

1 I Haue bought 97 pawnes $\frac{1}{2}$ of Geanes Veluet, & I would know how many yards they wil make? Ans. say by the rule of three, if 100 pawnes do make 26 yards, what wil 97 $\frac{1}{2}$ make multiplie and diuide, and you shal haue 25 yards $\frac{7}{20}$. So many yards doe the 97 pawnes $\frac{1}{2}$ containe.

Or otherwise, take some other num-

ber at your pleasure, as 25 pawnes which doo make 6 yardes $\frac{1}{2}$, and then say by the rule of three, if 25 pawnes doe make 6 yardes $\frac{1}{2}$, what will 97 $\frac{1}{2}$ pawnes make? Multiplie and diuide, and you shall finde 25 yardes $\frac{7}{20}$, as before.

More, at 2 shillings 7 d. the pawne of Geanes, what will the English yard be worth after the rate? Answere, say by the rule of three, if $\frac{13}{50}$ of an English yarde bee woorth 2 shillings, $\frac{7}{12}$, what is $\frac{1}{1}$ yarde woorth? Multiplie and diuide, and you shall finde 9 s. 11 d. $\frac{3}{13}$, So much is the English yard worth.

Or otherwise, multiplie 100 pawnes which is 26 yards, by 2 s, 7 d. and there of cometh 258 s, 4 d. y^e which you must diuide by 26 yardes, and you shall finde 9 s. 11 d. $\frac{3}{13}$, as before.

3 If 257 Pawnes $\frac{1}{2}$, bee woorth 20 li. 16 s. 8 d, what is one yard woorth after the rate? Answere: say by the rule of three, if 257 $\frac{1}{2}$ pawnes bee woorth 20 $\frac{5}{6}$, what are 3 pawnes $\frac{11}{13}$ woorth,

Multi-

Multiplie and diuide, and you shall finde $\frac{61510}{40168}$ parte of a pounde, which is woorth 6 s. 2 d. $\frac{914}{13395}$, and so much is one yard woorth.

The 7. Chapter treateth of Marchandise sold by waight.

1. AT 9 d. $\frac{1}{2}$, the ounce, what is the li. waight woorth? Answere: say, if $\frac{1}{1}$ giue 9 $\frac{1}{2}$, what will $\frac{16}{1}$ giue? Multiply and diuide, and you shall find 12 s. 8 d. so much is the yard woorth.

Or otherwise, by the rules of practise for 6 pence, take the $\frac{1}{2}$ of 16: which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s, which is 4 s. Finally, for the halfepenie, take 16 ob. which are 8 d. then adde all these numbers together, and you shall finde 12 s. 8 d: as before.

3 More, at 10 d $\frac{1}{2}$, the ounce: what are 112 li. waight worth after y rate? Answere, reduce 112 li. into ounces, in multiplying 112. by 16 ounces, & you shall haue 1792 ounces, then say

by the rule of three, if $\frac{1}{1} \times 10\frac{1}{2}$ $\frac{1792}{1}$.
Multiplie and diuide, and you shal find 18816 d. which doe make 78 li. 8 s. and so much are the 112 li. woorth after 10 d. $\frac{1}{2}$, the ounce.

4 At 12 s. 8 d. the li. waight, what is the ounce woorth? Answere: put 12 s. 8 d. into pence, and you shall haue 152 pence: then say by the rule of three, if 16 ounces cost 152 pence, what shal 1 ounce cost? Multiplie and diuide, and you shall finde 9 pence $\frac{1}{2}$, so much is the ounce woorth.

Or otherwise, take the $\frac{1}{4}$ of 12 s. 8 d. for 4 ounces, and thereof commeth 3 s. 2 d. then for one ounce, take the $\frac{1}{4}$ of 3 s. 2 d. and you shall haue 9 d. $\frac{1}{2}$, as before.

5 At 32 li. 10 s. the quintall, that is to say the 100 li. waight: what is 1 li. waight woorth after the same rate? Answere: Put 32 li. 10 s. all into shil. and you shall haue 650 s.

Then say by the rule of three, if 100 giue

giue 650, what will I giue? multiplie and diuide, and you ſhal find 6 s. 6 d. ſo much is the li. woorth.

6 If one pound waight of Saffron do coſt me 18 s. 8 d. what ſhal 355 li. 10 ounces coſt mee by the ſame price? Anſwere: ſay by the rule of three, if $\frac{1}{1}$ ✕ $18\frac{2}{3}$ $355\frac{5}{8}$. Multiplie and diuide, and you ſhall find 331 li. 18 s. 4 d. ſo much are the 355 li. 10 ounces woorth.

Briefe rules of waight.

Who that multiplieth ẏ pence that 1 li. waight is woorth, by 5, and diuideth the product thereof by 12, he ſhall finde howe manie poundes in money the quintall is woorth, that is to ſay, howe much the 100 pounde waight is woorth.

And contrariwiſe, he that multiplieth the poundes of money that the 100 li. waight is woorth by 12, and diui-

deth the product by 5, shall finde howe manye pence the pounde waight is woorth.

Example.

At 17 pence the pound waight, what is the 100 pounde waight woorth: Answere, Multiplie 17 by 5, and thereof commeth 85, diuide the same by 12, and you shall finde 7 pounde $\frac{1}{12}$ in money, which $\frac{1}{12}$ is worth one shilling and eight pence. So much is the 100 pound waight worth.

More, at 13 li. the 100 li. waight, what is one pounde waight woorth. Answere, Multiply 13 by 12, and thereof commeth 156: the which diuide by 5, and you shall finde 31 d. $\frac{1}{5}$, which $\frac{1}{5}$ is 2 s 7 d. $\frac{1}{5}$, and so much is one pounde waight woorth.

The like is to be done of yards, elles, or of any other measure, when we recken but fiue score to the hundred.

Briefe rules for measure.

Who that multiplyeth the pence the

one

one elle is woorth, by 2. And diuideth the product by 4, hee ſhall finde howe many pounds in money the 120 elles are woorth, which 120 elles we count but for a C. in this place, becauſe of worke, which meaſure is vſed for Canuas onely.

Or otherwiſe, if you diuide the penies that one elle is woorth, by 2: you ſhall haue in your quotient the pounds, that the ſaid 120 elles are woorth, and if any thing remaine, they are partes of a pound.

And contrariwiſe, he that multiplyeth the pounds in money that the 120 elles are woorth, by 4, and diuideth the ofcome by 2, ſhall finde howe manie pence the elle is woorth.

Or otherwiſe, if you multiplie the poundes that 120 elles are woorth, by 2, you ſhall finde in the product how many penies one elle is woorth.

Example.

At ten pence the elle, what are 120 elles woorth? Anſwere, multiply 10 d.

by 2, and thereof commeth 20. The which diuide by 4, and you shall finde 5 pound: so manie poundes in money are 120 elles woorth, at 10 d. the elle.

Or otherwise, diuide 10 penies by 2, and thereof commeth into your quotient 5: which 5 dooth represent 5 li. and so manie poundes are the 120 elles woorth, as before.

More. at 9 pounde, the 120 elles, what is one elle woorth? Answere: Multiplie 9 li. by 4, and thereof commeth 36, the which diuide by 2, and you shall finde 18 d. so much is one elle woorth.

Or otherwise, if you multiplie 9 poundes which is the price that the 120 elles are woorth, by 2, you shall haue in the product 18: which 18 doth signifie the penies that 1. ell is woorth, when the 120 elles doth cost 9 pounde, as before.

The lyke is to be done of all maner of wares, which are sold after 120 for the hundred.

Briefe Rules for our hundred waight here at London, which is after 112. lib. for the C.

VVho that multiplieth ẏ pence that one pounde waight is woorth by 7, and diuideth the product by 15, shal find how manie poundes in money the 112 pound waight is woorth.

And contrariwise, hee that multiplyeth the pounds in money, that 112 li. is worth, by 15, and diuideth the product by 7, shall finde howe manie pence one pound waight is worth.

Example,

At 9 pence the pound waight, what is the 112 li. waight worth? Answere: Multiplie 9 d. by 7, and thereof commeth 63: the which diuide by 15, and you shall find 4 pounde $\frac{3}{15}$, which being abbreuied, is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 pound is worth 4 pounds, 4 shillings, after the rate of 9 d, the pound.

At

At 8 li. the 112 li. waight, what is 1 pound waight worth? Answer. Multiply 8 li. by 15. and thereof commeth 120 the which diuide by 7, and you shall finde 17 d. $\frac{1}{7}$, so much is 1 pound waight woorth, when the 112 li. is woorth 8 pounds.

The 8 Chapter treateth of Tares and allowances for marchandise sold by waight.

1. AT 12 li. the 100 suttel, what shall 987 li. suttell be woorth? in giuing 4 li. waight vpon euery 100 for tret? Ans. adde 4 li. vnto 100, and you shall haue 104. Then say by the rule of 3, if 104 bee woorth 12 li. what are 987 li. waight worth? Multiply and diuide, and you shall find 113 li. $\frac{23}{26}$. which is worth 17 s. 8 d. $\frac{4}{13}$. So much shall the 987 li. waight be worth.

104 | 12 | 987.

2 At 6 s. 8 d. yͤ pound waight, what shall 345 li. $\frac{1}{2}$ be worth in giuing 4 li. waight vppon euery 100. for the tret. Aunswere: see first by the rule of three, what the 100 pound is woorth, saying, if $\frac{1}{1} \times 6\frac{2}{3}$. $\frac{100}{1}$. Multiplie and diuide, and you shall finde 33 li. $\frac{1}{3}$, then adde 4 li. vnto 100: and they are 104, then say againe by the rule of three, if 104 li. bee solde for 33 li. $\frac{1}{3}$, for howe much shall 345 li. $\frac{1}{2}$ bee solde? Multiplie and diuide, and you shall finde 110 li. 14 s. 8 d. $\frac{12}{13}$. For so much shall the 345 $\frac{1}{2}$ be solde, at 6 s. 8 d. the pound, in giuing 4 vpon the 100.

3 More, if 100 li. be worth 36 s. 8 d. what shall 780 li. be worth, in rebating 4 li. vpon euery 100, for Tare & Closse Ans. Multiplie 780 by 4, and thereof commeth 3120. The which diuide by 100, and you shall haue 31 li. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780, and there will remaine 748 $\frac{4}{5}$. Then say by the rule of three, if $\frac{100}{1}$ do cost 36 $\frac{2}{3}$, what will 748 $\frac{4}{5}$ cost after the rate? Multiplie and diuide so

shall

13·14·6 $\frac{18}{25}$

ſhal you find 274 ß. 6 d. $\frac{18}{25}$, and ſo much ſhal the 780 li. coſt, in rebating 4 pound vpon euery 100, for Tare and Cloffe.

4 More, whether doth hee loſe more, that giueth 5 pound vpon the 100, or he that rebateth 5 pounde in the 100 for tare & cloffe? Anſwere: Firſt, note that he which giueth 5 pound vpon the 100, giueth 105 for 100: and hee which rebateth 5 pound in the 100, giueth the 100 for 95. Therefore ſay by the rule of three: if 105 be giuen for 100, for howe much ſhall the 100 bee giuen? Multiplie and diuide, and you ſhall finde 95, $\frac{5}{21}$, and he which rebateth 5 in the 100, maketh but 95 of a 100: ſo that hee loſeth 5 in the 100, and the other which giueth 5 vpon the 100, loſeth but 4, $\frac{16}{21}$, vpon the 100. Thus you may ſee that he which rebateth 5 in the 100, loſeth more, by $\frac{5}{21}$ in the 100, then the other which gaue 5 vppon the 100 for Tare and Cloffe.

5 If 100 pound of Allom do caſt me

Baker, H.

26 s. 8 d. how shal I sell the li. waight, to gaine after the rate of 10 vppon the 100? Answere: put 26 s. 8. d. all into pence, and you shal haue 320 d. Then say by the rule of three, if 100 giue 110, what shal 320 giue? Multiplie 320 by 110, and diuide the product by 100, and you shal finde 352 d. Then say againe, if 100 pound be worth 352 d. what is 1 pound worth? multiply & diuide, and you shal haue 3 d. $\frac{26}{50}$: which $\frac{26}{50}$, is woorth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to say, the pound waight shalbe woorth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfepenie, in gayning 10 vpon the 100.

6 If one pounde waight do cost mee 6 s. 10 d. and I sell the same for 7 s. 2 d. I demaunde how much I shal gaine vpon the 100 pound of money after the rate? Answere: say by the rule of three, if 6 $\frac{5}{6}$, yeeld 7 $\frac{1}{6}$, what wil $\frac{100}{1}$ yeelde? Put the whole numbers into their broken, then multiplie and diuide, and you shal finde 104 $\frac{36}{41}$, from the which subtract 100, & there resteth 4 pound $\frac{36}{41}$, so much

much is gained vpon the 100 pound of money after the rate.

7 More, if one pounde doe cost mee 5 s. 4 d. and I sell the same againe for 4 s. 9 d. I demaunde howe muche I shall loose vpon the 100 pounde of money? Answere, say, if 5 $\frac{1}{3}$, do giue but 4 $\frac{3}{4}$, what shall $\frac{100}{1}$ giue? Put the whole number into their broken. Then multiplie and diuide, and you shall finde 89 $\frac{1}{16}$, the which you must substract from 100, and there will remaine 10 li. $\frac{15}{16}$, so much is lost vpon the 100 pound of money.

$\frac{1}{16}$ li. is 15 d.

8 More, if the li. waight do cost mee 3 s. 2 d. and I sell it againe for 4 s. 4 d. how much shall I gaine vpon the 20 s? Ans. say, if 3 $\frac{1}{6}$ giue 4 $\frac{1}{3}$, what shall $\frac{20}{1}$ giue? Multiplie and diuide, and you shall finde 27 s. $\frac{7}{19}$, from the which abate 20 s. and there will remaine 7 s. $\frac{7}{19}$ which is 4 d. $\frac{8}{19}$, and so much is gained vpon the pound of money, that is to say vpon 20 s.

9 If

9. If the pound waight doe cost me 4 s. 4 d. and I sell it againe for 3 s. 2 d. I demaund how much I shall loose in the pound of monie, that is to saye, in twentie shillinges? Answere: say if 4 $\frac{1}{3}$ giue but 3 $\frac{1}{6}$, what will $\frac{20}{1}$ giue? multiplie and diuide and you shall finde 14 s. $\frac{8}{13}$, the which you must abate from 20 s. and there will remaine 5 shil. $\frac{5}{13}$ which $\frac{5}{13}$ is woorth 4 d. $\frac{8}{13}$ of a penie, and so much is lost vpon the pounde of monie.

The 9 chapter treateth of certaine questions done by the double rule, and also by the rule of three compound.

10. A Marchant hath solde wynes, for the summe of 300 poundes, and he hath gayned therein, after ten pound vpon the 100. The question is to know how muche hee gayned in all? Answere: Say by the rule of three, if a 110 li. doe gaine 10 li. what will 300 li. gain? Multiplie and diuide, and you

T. shall

shall finde 27 li. $\frac{3}{11}$, and so much hath he gayned in all.

11. A Marchant hath bought a peece of Hampshire Carsey, contayning 18 yards, for the price of 4 li. 10 shil. The question is to know, how many yardes he shall sell for 33 shil. 4 pence, to gaine 20 shil. in the whole peece? Answere: adde 20 shil. vnto 4 li. 10 shil. and they make 5 li. 10 s. Then say by the rule of three, if 5 li. $\frac{1}{2}$, do yeeld me 18 yardes, what will 1 li. $\frac{2}{3}$ yeeld? multiplye and diuide, and you shall finde 5 yards $\frac{5}{11}$, and so many yards shall he sell to gaine 20 s. in the whole peece.

12. A Marchant hath sold Sugars for the summe of 600 li. readie monie, and hee hath gayned in the whole the summe of 60 pound. The question is to know, how much he hath gayned vpon the 100 poundes? Answere, First you must substract 60 li. from 600 li. and there will remaine 540 li. Then saye by the rule of three, if 540 li. do gayne

60 li. what will 100 li. gayne, multiplie and diuide, and you shall find 11 li. $\frac{1}{9}$. And so much hath hee gayned vpon the 100 li.

13. More, if 1 li. waight of Maces doe cost me 5 s. 10 d. and afterward I do sell the same for 6 shil. the li. to bee payde for it at the end of three months: I demaund how much I shall gayn vpon 100 pound in 12 months, after the rate? Answere: Say by the first parte of the rule of 3 composed: if 5 s. $\frac{5}{6}$ in $\frac{3}{1}$ moneths, doe gaine $\frac{1}{6}$ of a shil. which is 2 pence, what will $\frac{100}{1}$ li. gaine in $\frac{12}{1}$ months? multiply and diuide, and you shall finde 11 li. $\frac{3}{7}$. And so much shall I gaine in 12 months, after the rate.

14. More, if 1 peece of kersie doe cost me 36 s. for what price maye I sell the same to be payde for it at the ende of 3 months, so that I may gaine thereby after the rate of 10 li. vpon 100 pound in 12 months? Answere: saye by the

first part of the rule of 3 composed, if 100 pounds in 12 moneths doe gayne 10 pounds, what will 36 s. gayne in 3 months, multiplie and diuide, and you shall finde $\frac{1080}{1200}$ of a shilling, the which being abbreuied, doth make $\frac{9}{10}$ of a shilling, which is woorth 10 pence $\frac{4}{5}$, the same you must adde with 36 shillinges, and then you shall haue 36 shil. 10 d. $\frac{4}{5}$. And for that price I must sell the peece of kersie, for to gaine therein 10 pounds vpon the 100 li. in 12 moneths, and giuing 3 moneths time for the paiment thereof.

15. More, if 6 yardes of Northerne kersie doe cost me 8 shil. and I sell 4 yards of the same kersie for 6 shillings, I demaunde whether I gaine or loose, and how much vpon 100 li. of money? Answere. First you must seeke what the foure yards of kersie did cost, saieng by the rule of three, if 6 yards did cost 8 shillings, what will foure yardes cost? Multiplye and diuide and you shal find 5 shillings $\frac{1}{3}$, and so much did the sayde

4 yards cost, therefore abate the same 5 $\frac{1}{3}$ from 6 s. and there will remaine $\frac{2}{3}$ of a shilling, which $\frac{2}{3}$ is gained in the same 4 yardes of kersey. Then say againe by the rule of three, if 5 $\frac{1}{3}$ doe gayne $\frac{2}{3}$, what will $\frac{100}{1}$ gayne? multiplie and divide, and you shall finde 12, and $\frac{8}{16}$, which $\frac{8}{16}$ being abreuied, is $\frac{1}{2}$. Therefore it appeareth that I shall gaine 12 li. $\frac{1}{2}$ vpon the 100 li. in selling 4 yardes of the saide kersey, for 6 shillings.

16 More, a Marchaunt hath bought a peece of damaske which cost him 8 s. the yarde, readie monie, and he selleth the same againe to another Marchant, for 10 s. the yarde, but he giueth two dayes for the payment, that is to say, two monthes for the one halfe, and 5 monethes for the other $\frac{1}{2}$. The question is to knowe, howe much the sayde first Marchant doth gaine vppon 100 pounds in 12 monthes after the rate aforesaid? Answere: you must adde the 2 monethes, and the 5 monethes both

together, and they make 7 monethes, whereof you must take the one halfe, which is 3 months $\frac{1}{2}$. And at that time the seconde marchaunt oughte to haue payde the whole at one entire paiment; and therefore saye by the first part of the rule of three composed: If $\frac{8}{7}$ shil. in 3 $\frac{1}{2}$ months do gaine $\frac{2}{7}$ shillinges, what wil $\frac{100}{1}$ gaine in $\frac{12}{1}$ months? Multiplie and diuide and you shall find 85 pound $\frac{5}{7}$. And so much dooth the first Marchaunte gayne vppon the 100 in 12 months.

17. A Marchant hath bought Veluet at 13 s. 6 d. the yarde, readie monie, & he selleth the same for 14 s. 3 pence the yarde, to be paid $\frac{1}{3}$ parte in readie money, $\frac{1}{4}$ part at 3 monethes, and the rest which is $\frac{5}{12}$ is to be payde to him at 5 months, the question is to knowe howe much the first marchaunt dooth gayne vpon the 100 pound in 12 months after the same rate? Answere: See first at what time all the paiments oughte to bee paide at once, and for to knowe the

same you must multiplie euery seuerall payment by the time it ought to bee paid, and ad them togither, then diuide the product by the totall summe of all the payments being added togeather, and your quotient will shewe at what time all the payments ought to be paid at once as in the former example, $\frac{1}{3}$ part in readie monie is not multiplied by any time, because it is payde presently, then $\frac{1}{4}$ part being multiplied by three moneths maketh $\frac{3}{4}$ of a moneth, and $\frac{3}{4}$ the rest beeing $\frac{5}{12}$ multiplied by 5 mo- $\therefore \frac{5}{12}$ neths bringeth 2 $\frac{1}{12}$, then adde $\frac{3}{4}$ and 2 $\frac{1}{12}$ together, and they make 2 moneths $\frac{5}{6}$, the whiche is the iust time, that all the payments ought to be paid at once. And therefore saye by the first part of the rule of three composed. If 13 $\frac{1}{2}$ in 2 moneths $\frac{5}{6}$, doe gayne $\frac{3}{4}$ of a pound, what will 100 li. gain in 12 moneths after the rate? multiplye and diuide, and you shall finde 23 li. $\frac{09}{17}$. And so much dooth he gaine vppon the 100 li. in 12 moneths.

18. A Marchant hath bought fusteans which cost him 22 s. 6 d. the peece readie monie, and he will sell the same at 24 s. the peece. The question is to know what time he ought to giue for the payment of the same, to the ende he maye gaine after 9 li. vpon the 100 li. in 12 moneths? Answere, saye if $22\frac{1}{2}$ doe gaine $1\frac{1}{2}$, what will $\frac{100}{1}$ gayne: multiply and diuide, and you shall find $6\frac{2}{3}$ of gaine. Then say againe by the rule of three, if $\frac{9}{1}$ of gaine doe require $\frac{12}{1}$, what will $6\frac{2}{3}$ of gaine require, multiplie and diuide, and you shall finde $8\frac{8}{9}$, which is 8 months and $\frac{8}{9}$, and so long time ought he to giue, to gaine after the rate of 9 li. vpon the 100 li. in 12 moneths.

19. A Marchaunt hath bought a peece of Satten being in length 29 yardes, which did cost him 12 pounds and ten shil. readie monie, I demaund for what price he shall sell the yard, to bee payde at the end of 2 moneths, so that he maye gaine after the rate of 10 li. vpon the 100 li. in 12 mrneths? Answere, see

first

first what the yarde did cost him at the first, saieng by the rule of three, if twentie yards cost 12 li. 10 shil. what will 1 yard cost, multiplie and diuide, and you shall finde 12 shil. and 6 d. Then saye againe by the rule of three, if 12 moneths, doe giue me 10 li. what will 2 months giue, multiplie and diuide, and you shall finde 1 li. $\frac{2}{3}$. Adde therefore the sayd 1 $\frac{2}{3}$ vnto 100, and they are 101 $\frac{2}{3}$. Say therefore once againe, by the rule of three, if $\frac{100}{1}$ doe giue mee 101 $\frac{2}{3}$, what will 12 $\frac{1}{2}$ giue? Multiply and diuide, and you shall find 12 shillinges, and $\frac{17}{24}$ is worth 8 d. $\frac{1}{2}$, and for 12 shil. 8 d. $\frac{1}{2}$ must he sell the yarde of Satten, giuing 2 months time for the payment to gaine after the rate of 10 li. vpon the 100 li. in 12 moneths.

12 $\frac{17}{24}$ | 305. 6½
20 | 480. 96

20. More, if 1 li. waight of Sinamon doe cost me 8 s. readie monie, for what price shall I sell 100 li. waighte of the same, to be payd the $\frac{1}{4}$ at 1 moneth, and the residue at the end of 3 moneths, so that I may gaine after 9 pounds vpon the

the 100 li. in the 12 moneths after the rate? Answere:
seeke first in howe long tyme, both the paymentes shoulde bee made at once.

$\frac{1}{4}$.	$\frac{1}{1}$.	$\frac{1}{4}$.
$\frac{3}{4}$.	$\frac{3}{1}$.	$2\frac{1}{4}$.
		$2\frac{1}{2}$. mont.

The which to doe, you muste multiply each payment of monie by the time when it oughte to bee payde, that is to saye, you must multiplie the firste payment which is $\frac{1}{4}$ part by $\frac{1}{1}$ moneth, and therof commeth $\frac{1}{4}$ of a month, likewise you must multiply ye next paiment which is $\frac{3}{4}$ by 3 moneths, & thereof will come 2 moneths $\frac{1}{4}$. Then adde $\frac{1}{4}$ of a moneth, and 2 moneths $\frac{1}{4}$ both togeather, & they make 2 moneths $\frac{1}{2}$, which is the time that both the paymentes ought to bee paide at once. Then saye by the rule of three, if 12 months doe giue 9 li. what will 2 months $\frac{1}{2}$ giue? Multiplye and diuide, and you shall finde 1 $\frac{7}{8}$, say agayne by the rule of three. If 1 li. waight doe cost me 8 s. what will 100 li. cost? Multiplye and diuide, and you shall finde 40 pounds.

Then

Then say once againe, if $\frac{100}{1}$ doe giue 101 $\frac{7}{8}$, what will $\frac{40}{1}$ giue? Multiply & diuide, and you shall finde 40 $\frac{3}{4}$. And for 40 li. 15 shillinges, I must sell 100 li. waight of Sinamon to be paid at the two seuerall times aforesayd, to gayne therein after the rate of 9 pounds vpon 100 pound in 12 months, as by example aforesayd.

20. When the quarter of wheat dooth cost 6 s. 8 d. the loafe of bread waieng 20 ounces, is solde for a halfepenie, I demaund that if the quarter of wheate did cost ten shillings, for how much shal the loafe of bread be solde that waieth 16 ounces, you shall aunswere by the first part of ẏ rule of 3 composed, which is mentioned in the seconde Chapter of the third part of this booke, where you must say by the same first parte of the rule of three composed, if 6 $\frac{2}{3}$ | $\frac{20}{1}$ | $\frac{1}{2}$ | $\frac{10}{1}$ | $\frac{16}{1}$.

Then multiplie the first number by the seconde, and the product thereof shalbe your diuisors. Likewise multi-

ply

ply the other three numbers, the one by the other, and the producte thereof shall bee your divident: as thus, firste multiply $6\frac{2}{3}$ by $\frac{20}{1}$, and thereof commeth $\frac{400}{3}$, for your divisor, then multiplie $\frac{1}{2}$ by $\frac{10}{1}$, and the product thereof by $\frac{16}{1}$, so you shall have $\frac{160}{2}$, for your number that is to bee divided, then divide $\frac{160}{2}$, by $\frac{400}{3}$, and thereof commeth $\frac{480}{800}$, the which beeing abreuied, bringeth $\frac{3}{5}$ of a penie: and for that price must the loafe of bread bee solde, which wayeth 16 ounces, when the quarter of wheate is worth 10 shillings.

Or otherwise, by the rule of three at two times. First saye, if $\frac{20}{1}$ ounces give $\frac{1}{2}$, what will $\frac{16}{1}$ ounces give? multiplie and divide, and you shall finde $\frac{2}{5}$ of a penie. Then say againe, if $6\frac{2}{3}$ doe give me $\frac{2}{5}$, what will $\frac{10}{1}$ give? Multiplie and divide, and you shall finde $\frac{3}{5}$ of a penie, as before is said.

21. When the cariage of one hundreth waight of marchandise 50 miles doth cost 5 s, what shall the cariage of 500 waight

waight cost me for 16 miles, Answere: By the firste part of the rule of 3 composed, saieng, if 100|505|500|16. Multiply 100 by 50, the product will be 5000, which shall be your diuisor. Then multiply 5 times 500 by 16, and thereof commeth 40000 for your diuident. Therefore diuide 40000 by 5000 and you shall finde 8 shillinges, so much shall cost the cariage of 500 waight 16 miles.

Or otherwise, by the double rule of three, that is to say by the rule of three at two times, first say if 50 miles doe pay 5 s. what shall 16 miles pay, multiply and diuide, and you shall finde 1 s. $\frac{1}{5}$, Then say agayne, if 100 waighte doe cost mee 1 shil. $\frac{1}{5}$, what shall 500 waight cost? Multiply and diuide, and you shall finde 8 s. as before.

22. When the cariage of 100 pounde waight of marchandise 84 miles dooth cost me 6 s. how many miles maye I haue 64 pound waight carried for 3 s. 4 d. Answere, by the second part of the

rule

rule of three composed, and saye, if
$\frac{100}{1} | \frac{84}{1} | \frac{6}{1} | \frac{64}{1} | 3\frac{1}{3}$.

Then multiplye the fourth number $\frac{64}{1}$ by the third number $\frac{6}{1}$, and thereof commeth $\frac{384}{1}$ for your diuisor, likewise multiply $3\frac{1}{3}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, & you shall haue in the product $\frac{8400}{3}$: then diuide $\frac{8400}{3}$ by $\frac{384}{1}$, and you shall find 72 miles, & $\frac{11}{12}$ of a myle. So many miles shall the 64 li. waight be carried, for 3 s. 4 d.

Otherwise, by the rule of three at two times, First say, if 100 waighte doe cost me 6 shil. what shall 64 pounde waight cost? Multiply and diuide, and you shall finde 3 s. $\frac{21}{25}$. Then say, if $3\frac{21}{25}$ be payd for 84 miles cariage: for how many miles shall 2 s. $\frac{1}{3}$ be payd? Multiply and diuide, and you shall finde 72 miles $\frac{11}{12}$ as before. $3\frac{1}{3}$

23. If 100 horses in 100 dayes, doe spend 180 quarters of oates, howe manie quarters of oates will 350 horsses spend in 150 daies? Answere, by the first part of the rule of three composed, you must multiplye 180 times 350, by

150:

150: and diuide the producte by 100 times 100: and you shall finde 945 quarters. So many quarters of oates will 350 horses spend in 150 daies.

Or otherwise by the rule of 3 at two times: first say, if 100 daies doe yeelde me 180 quarters of oates, what shall 150 daies yeeld, multiply and diuide and you shall finde 270 quarters, then say againe, if 100 horses doe spend 270 quarters of oates, how many quarters of oates will 350 550 horses spend? Multiply and diuide, and you shall finde 945 quarters as before.

The tenth Chapter treateth of the Rule of Fellowship without any time limited.

THE rule of Fellowshippe is this: you must sette downe each mans summe of money that hee layeth into companye, euerye one directlye vnder the other, the which summes you shall adde all together, and the totall

summe

summe of all their whole stockes being thus assembled, shall bee your common diuisor, to the finding out of euerye mans part of the gaine, then you shall multiply either the gaine or else ẏ losse which soeuer of them dooth happen by each mans portion of monie that he laid in, and diuide the products by the sayd diuisor, so you shall haue in your quotient euery mans part of the gayne, if any thing be gayned, or else of the losse if any thing be lost.

Example.

1. Two Marchaunts haue layde their monie in company together, the first laid in 500 pound, the second layd in 300 pound, and with occupieng they haue gayned 60 pounds, I demaunde how much each man shall haue of the same gains according to the monie that hee layde in? Answere: adde 500 and 300 both together, whiche are the parcels or summes that they both laid in, and thereof commeth 800 for your diuisor: then say by the rule of three,

if

if 800 li. (which is their whole stocke) do gain 64 pound, what shal 500 pound gaine? (which is the first mans monie that he laid in) Multiplie and diuide, and you shall find 40 pounds for the first mans part of the gaine: then say, If 800 giue 64, what will 300 giue? Multiplye and diuide, and you shall finde 24 pound for the seconde mans parte of the gaine.

500				
300	800	64	500	
800				
	800	64	300	

Or otherwise, put 500 li. which is the first monie that he laide in, ouer the 800 li. which is the whole stocke, and you shall haue $\frac{500}{800}$, which being abbreuied doe make $\frac{5}{8}$, and such part of the gaine shall the first man take, that is to say, $\frac{5}{8}$ of 64 li. which is 40 li. and consequently by the same manner the second shall take the $\frac{3}{8}$ of 64, which is 24 pound, for his part of the gaine, as

before.

$$\frac{5|00}{8|00} \qquad \frac{3|00}{8|00}$$

2. Two marchants haue companied together, the firſt laid in 640 pounds, and he taketh $\frac{5}{8}$ parts of the gaine, I demaunde howe much the ſeconde Marchaunt laide in? Aunſwere, ſeeing that the firſt Marchant taketh $\frac{5}{8}$ of the gaine it followeth that the ſecond marchaunt muſt haue $\frac{3}{8}$ whiche is the reſt, and therefore ſay by the rule of three, if $\frac{5}{8}$ of the gaine which the firſt man taketh did laye into the ſtocke $\frac{640}{1}$. How much ſhall $\frac{3}{8}$ of the gaine laye in which is the ſecond mans gaine, multiplye and diuide, and you ſhall finde 384 li. ſo much ought the ſecond man to lay into company.

3. Two Marchants haue companied together, the firſt man laide in 640 pounds, and the ſeconde hath laide in ſo muche monie for his parte, that hee muſt haue 60 pound for his part of 100

li.

li. that they haue gained. I demaunde howe much the seconde man did lay into companie? Answere, Seing that the second man taketh 60 pound of the gain it followeth that the first must haue the rest of 100 pound, which is but 40 li. Therefore say by the rule of 3, if 40 li. doe lay in 640 li. what shall 60 li. laye in. Multiplie and diuide, and you shall finde 960 li. So much did the seconde marchant lay in.

4. Two Marchants haue companied together, the first laide in 83 li. 6 s. 8 d. the second laide in 170 duckets, and they haue gained 100 li. of the whiche the first man must haue 60 pound, I demaund what the ducket was woorth? Answere, Seing that the firste man must haue 60 li. it followeth that the seconde must haue 40 li. therefore saye by the rule of three, if 60 pound of gayn that the first man taketh, did lay in 83 li. 6 s. 8 d. principall, how much shall 40 li gaine put in, which is the gayne

that the second man taketh, multiplye and diuide, and you shall finde 55 li. $\frac{5}{9}$, so much are the 170 duckets woorth. Then put 55 li. $\frac{5}{9}$ into shillinges, and you shall haue 1111 s. $\frac{1}{9}$. So then for to know what the ducket is woorth, say by the rule of 3, if $\frac{170}{1}$ giue 1111 $\frac{1}{9}$, what will $\frac{1}{1}$ giue? Multiplie and diuide and you shall finde 6 s. 6 d. $\frac{22}{51}$: so much is the ducket worth.

5. Two Merchaunts haue companied together, the second man layde in more by 30 li. than did the first man: and they gained 120 li. of the whiche the first man ought to haue 50 pound, I demaund what ech of them did lay in? Answere, from 120 li. abate 50 li. and there resteth 70 li. for the second mans part: so that by this meane the seconde man because hee layde in 30 li. more than the first man did, taketh 20 pound more of the gaine, and therefore saye by the rule of 3, if 20 li. gaine did lie in 30 pound principall, how much shall 50 li. gaine lie in? Multiplie and diuide, and you

you shall find 75 pound, so much did the first man lay in, and consequentlye the second laid in 105 li.

6 Two Merchaunts haue companied together, the seconde hath laid in twise so much as the first man did, and 10 li. more: and they haue gained 100 li. of the which the first ought to haue 32 li. for his parte. I demaunde how much each of them did lay into companie? Auns. If it were not for the 10 li. that the second man laide in more than the first, he shoulde haue had but 64 li. of the gaine, which is the double of the first mans parte. But because hee layde in 10 li. more, he hath therefore foure pound more of the gaine, and therefore say by the rule of three, if 4 li. gaine did lie in 10 pound of principall (which was ouer and aboue the double of the first mans laieng in) what shall 32 li. of gaines lay in? which is the first mans parte of the gaines that hee taketh. Multiply & diuide, and you shall finde 80 pounds for the first mans laying in: and consequently 150 poundes

for the second mans portion that he layed in.

7. Two merchants haue companied together, and they haue gained 100 li. of the which the first must haue after the rate of 10 li. vppon the 100 li. and the second must haue after the rate of 15 li. vpon the 100 li. I demaunde how much ech of them ought to haue? Answere, Put 10 li. for the first mans layeng in, & 15 li. for the second mans laieng in: adde therefore 10 pound, and 15 li. together, and they make 25 li. Then put 10 ouer 25, & it is $\frac{10}{25}$, which beeing abbreuied are $\frac{2}{5}$. Therefore he that taketh 10 li. vpon the 100 li. must haue the $\frac{2}{5}$ of the gaine, which is 40 li. Then put 15 ouer 25, & it is $\frac{15}{25}$, which being abbreuied are $\frac{3}{5}$. Therefore the second must haue $\frac{3}{5}$ of the 100 li. which is 60 li.

8. Two marchants haue companied together, the first laide in 46 li. 18 shil. and the second laide in 33 li. 2 shil. so

they

they haue gained 30 pound, I demaund how much euery man ſhall haue for his part of the gaine? Anſ. Adde 46 pound 18 s. and 33 pound 2 s. both together, and you ſhall find 80 li. for your common diuiſor, then ſay if 80 pound which is all their ſtocke doe gaine 30 li. what will 46 $\frac{9}{10}$ gaine? which is the monie that the firſt man laide in? Multiply & diuide and you ſhall finde 17 pound 11 ſhil. 9 pence for the firſt mans parte of the gaine. Then ſay againe by the rule of three: if 80 li. doe gaine 30 li, what will 33 li. $\frac{1}{10}$ gaine, which was the ſecond mans monie that he laid in, multiplie and diuide, and you ſhall finde 12 pound 8 ſhil. 3 d. for the ſeconde mans part of the gaine.

And after the ſame maner ſhall you doe in caſe there were three or foure Marchants that would companie together, adding all and euerye of their ſummes of monie (which they laid into ẏ ſtocke) into one totall ſumme: which ſhall bee your common diuiſor: and then worke with the reſt, as is taught in the for-

ther question of the rule of company.

Example.

6. Three Merchants haue companied together, the first laid in I knowe not how much, the second did put in 20 peeces of cloth: and the third hath layde in 500 pounds. So at the ende of their company, their gaines amounted vnto a 1000 li. whereof the first man ought to haue 350 pounds, and the second must haue 400 pound.

Now I demaund how much the first man did lay in, and for howe much the twentie peeces of cloth were put into company.

Answere.

Seeing that in the first and the second marchants must haue 750 pounds for their parts of the gaine, then the thirde man must haue the rest of the 1000 li. which is 250 li. And therefore say by the Rule of three, if 250 li.

750
250
1000.

gaine

gaine be come of 500 li. principall, of how muche shall come 350 li. gayne, which the first man taketh, multiplye and diuide, and you shall finde 700 li. So much did the first man lay in: then say if 250 li. gaine bee come of 500 li. principall, of how much will come 400 pound, which is the gaine that the second man taketh. Multiply and diuide, and you shall find 800 pound. For that price were the 20 peeces of cloth layde into company.

10 Three merchants haue gained 100 li. the first must haue the $\frac{1}{2}$, the second must haue $\frac{1}{3}$, and the thirde must haue $\frac{1}{4}$. I demaund how much euerye man must haue of the gaine? Answere. Reduce $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, into a common denomination, after the order of the second reduction in Fractions, and you shall finde $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$: Then take 12 for the first mans layeng in, 8 for the second mans layeng in, and 6 for the thirde mans layeng in. The whiche

three numbers being added together, shall be your common diuisor, and they doe make 26. Then multiply 100 li. by 12 for the first man: then againe 100 li. by 8 for the seconde, and last of all 100 pound by 6 for the third man, and diuide the products of euery multiplycation by 26. So shall you finde 46 li. $\frac{2}{13}$ for the first mans part of the gaine. 30 li. $\frac{10}{13}$ for the second mans part, and 23 li. $\frac{1}{13}$ for the third mans part.

11. Two Marchants haue gayned 100 li. the first must haue $\frac{1}{2}$ and 5 li. more, the second must haue $\frac{1}{3}$ and 4 li. more. I demaunde how muche each of them shall haue? Aunswere. Firste from 100 abate 5 and 4, which are 9, so there will remaine 91, then take the $\frac{1}{2}$ of 100 li. which is 50 li. for the first mans laieng in. Likewise take $\frac{1}{3}$ of 100 li. for the second mans layeng in, which is 33 li. $\frac{1}{3}$. Then adde 50 li. and 33 li. $\frac{1}{3}$ together, and you shall haue 83 li. $\frac{1}{3}$ for your common diuisor, then multiply 91 pound by 50, and diuide

by

note.

6

by $83\frac{1}{3}$, and thereof commeth 54 li. $\frac{3}{5}$, vnto the which number adde 5, and all is 59 li. $\frac{3}{5}$ for the first mans part of the gaine. Likewise multiplye 91 by $33\frac{1}{3}$, and diuide by $83\frac{1}{3}$, and you shall finde 36 li. $\frac{2}{5}$, vnto the whiche adde 4, and you shall haue 40 li. $\frac{2}{5}$, for the second mans part.

91
$33\frac{1}{3}$
$3033\frac{1}{3}$

12. Two Merchants haue gayned 100 pound, the first must haue $\frac{1}{2}$ lesse by 4 pound, the second must haue $\frac{1}{3}$ lesse by two li. I demaund how muche each of them shal haue? Answere, Adde 4 and 2 with 100, & they make 106, then take as before is sayd, 50 li. for the first man & $33\frac{1}{3}$ for the second & adde them both together, and they be $83\frac{1}{3}$, which shalbe your diuisor. Then multiplie 106 by 50, and diuide the product by $83\frac{1}{3}$, so thereof commeth 63 li. $\frac{3}{5}$. From the which abate the 4 li. lesse that the first man taketh, and then is there remayning 59 li. $\frac{3}{5}$ for his part. Likewise multiply 106 by $33\frac{1}{3}$, and diuide by $83\frac{1}{3}$,

and

and you shall finde 43 li. $\frac{2}{3}$, from the which abate 2 pound lesse, and there remaineth 40 li. $\frac{2}{3}$ for the seconde mans part.

The rule of Fellowship with time.

THe monie that euery man layeth in, must be multiplied by the time that it continueth in company, and of that which commeth thereof, you shall make their new laiengs in for ech of them, and then multiplye the gaines by euery one of them seuerally, and the of-comes you shall diuide by all their new laiengs in, added together, and then you shall haue proportionally ech mans part of the gaine according to his laieng in.

Example.

1 Two merchants haue companyed together, the first hath put in the first of Januarie 450 pounds, the seconde did lay in the second of May 750 pound

And

And at the yeares end they had gained 100 li. I demaund howe much each of them shall haue of the gayne? Answ. for as much as the first did put 450 li. the first of Januarie, his monie continued in company 12 months, & therefore multiplie 450 by 12 months, and thereof commeth 5400, for his new laieng in. And the seconde layd in his 750 li. but at the first day of Maye: so that his monie remaineth in companie but 8 months. Therefore multiplie his 750 li. by 8, and thereof commeth 6000 for his newe laieng in. Then ad 5400 with 6000, and they make 11400 for your common diuisor, then multiplye 100 li. which is the gaines, by 5400, & diuide the producte by 11400, and therof wil come 48 li. $\frac{7}{19}$, for the first mans part of the gaine. Likewise multiplye 100 by 6000, and diuide the producte by 1140, and you shall finde 52 $\frac{12}{19}$, and so much must the second man haue for his part of the gaine.

2. Two Merchants haue companied together, the first hath laide in the first

first of Ianuarie 640 li. The seconde can laye in nothing vntill the firste of Aprill, I demaunde how much he shall then lay in, to the ende that hee maye take halfe the gaines? Answere, multiplie 640 li. by 12 moneths that his monie abideth in companie, and there of will come 7680 li, for his layeng in. And so much ought the second man to lay in, for because he taketh $\frac{1}{2}$ of the gaine. But for that, that he putteth in nothing vntill the first of Aprill, his money can be in companie no longer than 9 moneths. And therefore diuide 7680 by 9, and thereof will come 853 li. $\frac{1}{3}$. So much ought the seconde marchant to lay in the first of Aprill, to the ende that hee may take the one halfe of the gaines.

3. Three Merchants haue companied together, the first laide in the firste of March 100 li. The seconde laide in the first of Iune so much money, that of the gaine he must haue the $\frac{1}{3}$ parte: and the thirde laide in the first of Nouember

uember so much monie, that of the gaines he must haue likewise $\frac{1}{3}$, & they continued in company vntill the nexte March following. I demaunde howe much the seconde and the thirde Marchants did lay in? Answere, Multiply 100 li. which the first man did laye in by 12 moneths, that his money continued in company, and thereof commeth 1200 for his laieng in, and so much ought the seconde and the thirde Marchants each of them to lay in, because they part the gaines by thirdes. But for that, that the second Merchaunte layeth in nothing till the first of June, his monie can be in companie but nine moneths. Therefore diuide 1200 by 9 moneths, and thereof will come 133 $\frac{1}{3}$. And so much ought the seconde Merchant to lay in. Then, for as much as the thirde Marchaunt did lay in nothing vntill the first of Nouember, his monie abideth in company but the space of 4 moneths: Therefore diuide 1200 by 4, and thereof commeth 300 li. And so much ought the thirde Marchant

chant to lay into company.

4 Three Merchaunts haue compa-
nied together, the first laide in the first
of Januarie 100 Duckets, the second
haue laide in 50 li. the first of Marche,
and the third put in a Jewell the firste
of Julie, and at the yeares ende they
had gained 400 crownes, of the which
the firste Merchaunt must haue fiftie
crownes, and the seconde must haue
80. I demaunde what the Ducket
was worth? and at what price the Je-
well was valued, whiche the thirde
Marchant laide in? Answere, the firste
mans monie beeing 100 Duckettes,
multiplied by 12 is 1200 Duckets,
by the rule aforesaide, and hee taketh
50 Crownes of the gaine, therefore
saye, if 50 Crownes gayne be come
of 1200, which was his stocke, of howe
much shall come 80 Crownes gayne,
that the second man taketh? Multiplie
and diuide, and you shall finde 1920,
for the seconde Merchants layeng in.
Then saye againe, if 50 Crownes bee

come

come of 1200 stocke, of howe muche shall come 270 crownes, whiche the thirde man taketh of the gayne: multiplye and diuide, and you shall finde 6480, for the thirde marchants laying in. Then diuide 1920, which is the second manes laying in. by 10 monethes that his money did continue in companye, and you shall finde 192 Duckets, whiche are worthe 50 li. because hee layed in 50 li. Then diuide 50 li. (being first reduced into shillinges by the sayde 192 Duckets) and thereof will come 5 shillinges 2 pence $\frac{1}{2}$. So much was the Ducket worth: Finallye diuide 6480, (which is the thirde manes laying in) by 6 monethes that his Jewell remayneth in companye, and you shall finde 1080 Ducketes, and for that price was the Jewel put into companye.

5. Three Merchants haue companied together: The first laide in the first of Januarie 160 li. and the firste of Aprill, he hath taken backe agayne 20 li.

The seconde hath laid in the first day of March 60 pound, and afterward he did lay in more 100 li. the first of August. The third laid in the first of Julye 150 li. and the first of October he did take back again 50 pound, and at the yeares ende they founde that they had gained 160 li. I demaunde how much euerie man shall haue of the gaine, Aunswere. Multiplie 100 li. which the first man layde in, by 12 moneths, and thereof commeth 1200 li. from that number abate 9 times 20 li. which are 180, for that which he did take backe agayne, and there will remaine 1020 li. for the first mans laieng in. Then multiply 60 which the second man laide in, by 10, and you shall haue 600, vnto the which adde 5 times 100 pounds for the mony he laid in more the first day of August, which are 500, so al amounteth to 1100 for the second mans layeng in. Afterwards multiplye 150 pounds, which the thirde man hath laid in, by six moneths, and thereof commeth 900, from the which number abate 3 times 50, & they

they are 150 for the monie that he did take backe againe the first of October, so there will remaine 750 for the third mans laieng in. Then proceed with the rest, as is taught in the first question of the rule of Fellowship with time, in adding 1020, 1100, & 750 altogether, which shall be your diuisor. Then multiplie 160 li. which is the gayne, by 1020, 1100, and by 750: and diuide at euery time by your diuisor, that is to say, by all their laiengs in added together, which is 2870, so you shall find 56 $\frac{246}{287}$, for the first man: 61 $\frac{93}{287}$, for the second, and 41 $\frac{232}{287}$ for the third man.

6. Two Marchants haue companied together, the first hath laide in 960 li. for the space of 12 months, and he ought to haue 8 pound vpon the 100 pound of the gayne. The seconde hath laid in 1120 poundes, for the space of 8 moneths, and hee ought to haue after 12 pounde vppon the 100 pound of the gaine.

And at the yeares ende they haue gayned 800 li. I demaunde how much eache of them shall haue of the gayne? Aunswere: multiplye 960 that the firste man did lay in by 12 monthes, and the product thereof multiply agayne by 8, and you shall haue 92160, that the firste manes laying in, then multiply ẏ 1120 that the second hath layde in, by 8 monthes, and that which commeth thereof, you shall multiply agayne by 12, & you shall finde 107520, for the seconde manes laying in, then proceede with the rest, as in the first question of the rule of Fellowship is declared, and as in this laste Example I haue taughte you, and you shall finde 369 li. $\frac{3}{13}$ for the first man: and 430 li. $\frac{10}{13}$ for the second man.

The rule of companie, betwene Marchants, and their Factors.

7. NOte that the estimation of the body or person of the Factor, is in

in such proportion to the stocke whiche the marchant laieth in, as the gain of ẏ sayde Factor is vnto the gayne of the marchaunt. As thus, if a marchaunt do deliuer into the handes of his Factor 200 li. to imploy, and hee to haue halfe the profit, the person of the sayde Factor shall be esteemed to bee worth 200 li. And if the Factor doe take but the $\frac{1}{3}$ of the gayne, hee should haue but $\frac{1}{2}$ so much of the gayne as the marchaunte taketh which must haue $\frac{2}{3}$, wherefore ẏ person of the Factor is esteemed but the $\frac{1}{2}$ of that which the marchant laieth in, that is to say 100 li.

And if the Factor did take the $\frac{2}{5}$ of ẏ gayne, then the Marchaunte shall take the residue which are $\frac{3}{5}$ of the gayne: wherefore the gayne of the Marchaunt vnto that of the Factor, is in suche proportion as 3 vnto 2. Then if you will knowe the estimation of the person of the Factor, saye if 3 giue mee 2 what will 200 giue? Multiplye 200 by 2, and diuide by 3, so you shall finde 133 $\frac{1}{3}$. Or otherwise, you muste consi-

der

der that the Factor taketh the $\frac{2}{3}$ of that which the marchant taketh, and therefore take the $\frac{2}{3}$ of 200, and you shall find 133 $\frac{1}{3}$, as before, and so much is the person of the Factor esteemed to bee woorth.

8. And if the marchaunt should deliuer vnto his factor 200 li. and the factor would lay in 40 li. and his person, to the end he might haue the half of the gaine, I demaunde for how much shall his person be esteemed? Answere, Abate 40 li. from 200 li. and there will remaine 160 li. And at so much shall his person be esteemed.

And if the Factor would take the $\frac{2}{3}$ of the gayne, his person with his 40 pound, shall be esteemed twise as much as the stocke that the marchaunt laieth in, which should haue the $\frac{1}{3}$ of the gayne for $\frac{2}{3}$ vnto $\frac{1}{3}$ is in double proportion, therefore double 200 pound, and thereof commeth 400 li. from the which abate 40 li. and there will remaine 360 li. But if the Factor would take onely

lye the $\frac{1}{3}$ of the gaine, that shall bee but the $\frac{1}{2}$ of $\frac{2}{3}$ which the marchant taketh: and then the estimation of his person with his laieng in shoulde be esteemed but the half of that which the marchant laieth in: you must therefore take the $\frac{1}{2}$ of 200 li. which is 100 li. from the which you shall abate 40 pounds, & the rest, which is 60 pound, the estimation of his person.

9. If it so chaunce for to make traffike of 240 li. that the person of the factor should be in such wise estemed, that he should haue but the $\frac{1}{4}$ of the gain, and yet he would haue the $\frac{2}{3}$, I demaunde how much ready mony he ought to lay in besides his person? Aunswere. Seeing that his person gaineth the $\frac{1}{4}$, therefore all the whole laying in, which is 240 pounds, shall gaine the rest, that is to say, the $\frac{3}{4}$, now for because $\frac{1}{4}$ is the $\frac{1}{3}$ of $\frac{3}{4}$, therefore his person shall be esteemed the $\frac{1}{3}$ of all the laieng in. Take then the $\frac{1}{3}$ of 240 pounds, and you shall haue 80 pounds for the estimation of

his person, and for because that hee will haue halfe of the gayne, you shall adde 80 li. with 240 li, and therof commeth 320. li. of the which take ẏ halfe, which is 160 li. and from the same you shal abate the 80 li. & ther wil remaine other 80 li. which he ought to lay in of ready money, and the marchant muste lay in the ouerplus, which amouunteth to 160 li.

10 A Marchaunt hath deliuered to his Factor 1200 li. to gouerne them in the trade of marchandise, vpon such condition, that hee for his seruice shall haue the $\frac{1}{3}$ of the gayne, if anye thing be gayned, and he shall beare the $\frac{1}{3}$ of the losse, if anye thing bee loste: I demaunde howe muche his person was esteemed; Aunswere, seeing that the Factor taketh the $\frac{1}{3}$ of the gayne, his person ought to bee esteemed as muche as one halfe of the stocke whiche the Marchant layeth in, that is to saye, the $\frac{1}{2}$ of 1200 li. which is 600 li. The reason is, for because the $\frac{1}{3}$ of the gayn that

the

the Factor taketh, is the $\frac{1}{2}$ of the $\frac{2}{3}$ of the gaine that the marchaunte taketh, And so the Factor his person is esteemed to be worth 600 li.

11. A marchaunt hath deliuered vnto his Factor 1200 li. and the Factor laieth 500 li. & his person. Now, because he layeth in 500 li. and his person, it is agreede betweene them, that he shall take the $\frac{2}{5}$ of the gayne: I demaund for how muche his person was esteemed? Answere, Forasmuch as the Factor taketh the $\frac{2}{5}$ of the gayne, he taketh the $\frac{2}{3}$ of that which the marchaunt taketh, for $\frac{2}{5}$ are the $\frac{2}{3}$ of $\frac{3}{5}$: and therefore the Factors laying in, ought to bee 800 li. which is the $\frac{2}{3}$ of 1200 li. that the marchant laid in. Then abate 500 li. which the Factor did laye in, from 800 li. which should be his whole stocke, and there remaineth 300 li. for the estimation of his person.

12. More, a marchaunt hath deliuered vnto his Factor 1000 li. vppon

such

such condition, that the Factor for his paines & seruice, shall haue the gaines of 200 pound, as though he laide in so much ready monie: I demaunde what portion of gaine the sayd Factor shall take? Ans. See what part the 200 li. (which the Factor laid in) is of 1200, which is the whole stocke of their company, and you shall find that it is the $\frac{1}{6}$ and such part of the gaine shall the factor take.

But in case that in making their couenants, it were agreed between them that the factor should haue the gayne of 200 pound of the whole stocke, which the marchaunt laieth in, that is to saye, of the 1000 pounds. Then should the Factor take the $\frac{1}{5}$ of the gayne, for 200 li. is the $\frac{1}{5}$ of a 1000 pound.

The xi. Chapter treateth of the Rules of Barter, that is, to change ware for ware, &c.

1 Two marchaunts will chaunge their marchandise the one with the

the other, the one of them hath cloth of 7 s. 1 d. the yard to sell for redie monie, but in barter he will sell it for 8 shil. 4 pence. The other hath Sinamon of 4 shil. 7 d. the pound to sell for ready monye, I demaund how he shall sell it in barter that he be no loser? Answere, say if $7\frac{1}{12}$: (which is the price that the yard of cloth is worth in readie monie) be solde in barter for $8\frac{1}{3}$ for what shall $4\frac{7}{12}$ be sold in barter, which $4\frac{7}{12}$ is the price that the pounde of Synamon is worth in readie monie, reduce ye whole numbers into their broken, and then multiplie and diuide and you shall finde 5 s. 4 d, $\frac{12}{17}$ parts of a penie, and for so much shall he sell the pounde of Synamon in barter.

2. Two marchants will barter their marchandise the one with the other, the one of them hath Chamlets of 2 pound 18 s. 5 d. the peece, to sell for redie money, and in barter he will sell the peece for 4 li. 3 s. 4 d. the other hath fine caps of 35 s. 10 pence the dosen, to sel in barter

ter. I demaunde what the Dossen of cappes were worth in readye money? Ans. say if 4 li. 3 s. 4 d. which is ẏ ouer price of the pece of Chamlet, be come of 2 li. 18 s. 4 d. which was the iust price of ẏ same, of what shall come 35 s. 10 d. whiche is the ouerprice of the dossen of caps? Multiplye and diuide, and you shall finde 25 s. 1 d. and so much are the dossen of caps in ready money.

3. Two Marchauntes will chaunge their Marchandise the one with the other: the one of them hath Fustians of 18 s. 4 d. the pece to sel for ready money, and in barter he will sell the peece for 26 s. 8 d. The other with Tapistry of 15 d. the elle, to seil for readye money and in barter he will sell it for 20 d. the elle, I demaunde whiche of them gayneth, and how much vpon the 100 li. of money. Answere, say if 18 s. $\frac{1}{3}$ whiche is the iust price of the peece of Fustian be solde in barter for 26 s. $\frac{2}{3}$: for howe muche shall 1 s. $\frac{1}{4}$, whiche is the iuste price of the elle of tapistrie bee solde in

bar-

barter; multiplye and diuide, and you shall finde 21 d. $\frac{9}{11}$. And hee doth ouersell it but for 20 d. so that of 21 d. $\frac{9}{11}$ he maketh but 20 d. and therefore saye by the rule of three, if the seconde Marchaunt of 21 $\frac{9}{11}$, doe make but $\frac{20}{1}$, howe much shall he loose in the $\frac{100}{1}$: Multiply and diuide, & you shall find 91 $\frac{2}{3}$ the which being abated from 100, there will remayne 8 $\frac{1}{3}$. And after the rate of 8 $\frac{1}{3}$ doth the second marchant loose in the 100. And consequentlye the firste marchant of 20 d. maketh 21 d. $\frac{9}{11}$, and therefore saye agayne by the rule of 3 if the first marchant of $\frac{20}{1}$, do make 21, $\frac{9}{11}$, how much shall he gayne vppon $\frac{100}{1}$ Multiplye and diuide, and you shall finde 190 li. $\frac{1}{11}$. And thus the first marchant gaineth after the rate of 9 li. $\frac{1}{11}$ vpon the 100 li. of money.

For youre better vnderstading of these questions, you muste note that when one marchaunt gayneth of another, after the rate of 10 li. vppon the 100 li. hee gayneth the $\frac{1}{10}$ of his owne principall, and the other whiche loseth after

after the rate of 9 $\frac{1}{11}$ in the 100 li. he looseth the $\frac{1}{11}$ of his principall. And it may be prooued thus, when one Marchant will sell his wares vnto another, which wares stande him but in 100 li. and he will sell them for 110 poundes, therefore he of his 100 pounds maketh 110 li. and so he gaineth after 10 li. vpon the 100, which is the $\frac{1}{10}$ of his principall, and the other which buieth wares for 110 li. that cost the other but 100 li. of the 110 li. he maketh but 100 li. And therefore say by the rule of 3, if 110 be come of 100, of how much shall come 100? Multiplie and diuide, and you shal find 90 $\frac{10}{11}$, the which abate from 100, and there will remaine 9 $\frac{1}{11}$, which is the $\frac{1}{11}$ of the principall that the seconde looseth in the 100 li. as afore is sayd. And therefore who so that will know what one Marchaunt gaineth of another, either after the rate of 10 pounds vpon the 100 li. which is the $\frac{1}{10}$ of his principall, or else after the rate of 20 li. vppon the 100 pound, which is the $\frac{1}{5}$ or of any other part, and that he would

like-

likewise know what part the other loo-
seth of his principall, he must take for
the numerator of the broken number of
him that looseth, as much as for him
that gaineth, then adde the numerator
and the denominator (of ẏ broken num-
ber of him that gaineth) both togeather,
and make thereof the Denominator of
the broken number of him that looseth,
and then shall you haue the iust patre of
him that looseth, as by Example, of
him that gaineth after 10 pounds vpon
the 100 pounds, which is the $\frac{1}{10}$ of his
principall: take the numerator of $\frac{1}{10}$,
which is 1, and make that the numera-
tor of the broken number of him that
looseth, then adde 1 which is the Nu-
merator of the fraction of him that gai-
neth, with 10, which is his Denomina-
tor, and you shall haue 11 for the Deno-
minator of the Fraction of him that lo-
seth. Then put 1 ouer the 11, and so you
shall haue $\frac{1}{11}$. Thus it appeareth when
one Marchant gaineth of another after
10 pounds vpon the 100 pounds, hee
gaineth the $\frac{1}{11}$ of his principall, and the
other

other looseth $9\frac{1}{11}$, whiche is the $\frac{1}{11}$ of his principall. And if he woulde gayne after 20, vppon the 100 li. which is the $\frac{1}{5}$ of his principall, the other should lose $16\frac{2}{3}$. which is the $\frac{1}{6}$ of his principall & soe is to bee vnderstande of all other fractions.

4. Two Marchantes will chaunge their marchandise the one with the other, the one of them hath Sayes of 20 s. and 10 d. the peece to sell for readie money, and in barter hee will sell the peece for 23 s. 4 d. and yet hee will gayne moreouer after, 10 pounde vpon the 100 pounde. The other hath wholle of 50 s. the 100 waight to selle for readie money. I demaunde howe hee shall sell a C. of woll in barter: Answere: say if 20 s. 10 d. which is the iuste price of the peece of Saie, be solde in barter for 23 s, 4 d. for howe muche shall 50 shil. (whiche is the iuste pryce of the C. of woll) be solde in barter: multiplye and diuide and you shall finde 56 s. Then for bicause ẏ first marchant will gaine

after

after 10 li. vpon the 100 li? he maketh of his 100 li. 110, so the seconde Marchant maketh of 110 li. but 100 pound. And therefore say by the rule of 3, if the second marchant of 110, doe make but 100, how much shall hee make of 56? Multiplie and diuide, and you shal finde 50 s. 10 d. $\frac{10}{11}$ of a penie, and for so much shal he sell the hundred of wooll in barter.

5. More, two marchaunts wil change their marchandise the one with the other, the one of them hath Taffeta of 16 crownes the peece, to sell for readie money, and in barter he will sell the peece for 20 crownes. and yet he will gaine moreouer after the rate of 10 li. vpon the 100 pound. The other hath Ginger of 3 s. 9 d. the pounde waighte, to sell in barter, I demaund what the pound did cost in readie money? Aunſ. say if 20 crownes which is the surprice of the peece of Taffeta, be come of 16 crownes the iust price, of howe much shal come 3 s. 9 d. which is the surprice

X of

of the pounde of Ginger? Multiplie and diuide, and you shall finde 3 shil. Then for because that the Marchaunt of Taffata will gaine after the rate of 10 vppon the 100: say if 100 doe giue 110: what will 3 s. giue? multiplie and diuide, and you shall finde 3 s, 4 d. $\frac{3}{5}$, and so much did the pounde of Ginger cost in readie money.

6. More, two Marchants will change their Marchandise the one with the other: the one of them hath Worsteds of 25 s. the peece, to sell for readie money and in barter he will sell the peece for 33 s. 4 d. and yet he looseth after 10 li. in the 100 li. the other hath ware of 3 li. 6 s. 8 d. the 100 waight to sell for readie money. I would knowe for what price he should sell his ware in barter? Annswere: say if 25 s. whiche is the iust price of the peece of Worsted, bee solde in barter for 33 s 4 d. for howe much shall 3 pounde 6 s. 8 d. bee solde which is the iust price of the 100 of ware, as it was woorth in readie money,

ney. Multiplie and diuide, and you shall finde 4 li. $\frac{4}{9}$ whiche is 8 s. 10 d. $\frac{2}{3}$, then for because that the Marchaunte of worsteds, looseth after 10 li. in the 100 li. of 100. li. he maketh but 90. & therefore say, if 90 giue 100, what giueth 4 pounde $\frac{4}{9}$? Multiplie and diuide, & you shall find 4 li. $\frac{76}{81}$, which is worth 18 s. 9 pence $\frac{5}{27}$, and for so much shall he sell the 100 pound weight of ware in barter.

7. More, two Marchants will change their Marchaundise the one with the other, the one of them hath worsteds of 5 li. 6. s. 8 d. the peece, to sell for readie money, and in barter hee will sell the peece for 6 pound 13 s, 4 pence, and yet hee looseth after 10 li. in the 100: and the other hath muske of 2 shil. 9 d. $\frac{1}{3}$ the pounde waight to sell in barter. I demaunde what the pounde did cost in readie mouey? Aunswere, say if 6 li. $\frac{2}{3}$, which is the ouerprice of the peece of Worsted, bocome of 5 li. $\frac{1}{3}$, which is the iust price of the same, of howe much

shall come 2 s. 9 d. $\frac{1}{3}$. Multiplie and diuide, and you shall find 2 s. $\frac{2}{9}$, which $\frac{2}{9}$ is 2 d. $\frac{2}{3}$: then for because that the marchant of Worsteds loseth after 10 li. in the 100 li. of 100 hee maketh but 90, therefore say, if 100 giue but 90, how much shall 2 s. $\frac{2}{9}$ giue? Multiplye and diuide, and you shall finde 2 shillinges, and so much cost the pound of muske in readie monie.

Other rules of Barter, wherein is giuen some part in readie monie.

WHen a Marchaunte ouerselleth his marchaundise, and hee will haue also some part of his ouerprice in readie monie, as the $\frac{1}{2}$, the $\frac{1}{3}$, or the $\frac{1}{4}$, &c. Hee must substract the same part of money from the iust price, and also from the ouerprice of his Marchaundise: and the two numbers that remaine after the substraction is made, shall bee the two first numbers in the rule of three, and the iust price of the seconde Marchaunt shall be the thirde num-

number: to know how much he shall ouersell the part of his marchandise.

Example.

8. Two Marchaunts will chaunge their Marchandise the one with the other, the one of them hath fine wooll, at 5 pound the 100 waight to sell for readie monie, and in barter he will sell it for 6 pound, and yet he will haue the $\frac{1}{3}$ in redie monie. The other hath cloth of 13 s. 4 d. the yard to sell for redy monie, I would know how he shall sel the same in barter. Answere, Take the $\frac{1}{3}$ of 6 li. which is the ouerprice of the 100 of wooll, and that is 2 pound, which you must abate from 5 li. which is the iust price of 100 of wooll, and also abate it from 6 pound which is the ouerprice, & there shall rest 3 li. and 4 li. for the two first numbers in the rule of three, then take 13 s. 4 d. which is the iust price of a yarde of cloth for the thirde number, then multiply and diuide, and you shall find 17 shil. 9 pence $\frac{1}{3}$: for so much shal

 the

the second sell his cloth in barter.

9. More, two marchants will chaunge their marchaundise the one with the other, the one of them hath waxe of 3 li. 9 s. 8 d. the C. to sell for readie money, and in barter hee will sell the same for 4 li. 3 s. 4 d, and yet hee will haue the $\frac{1}{4}$ in readie money: and the other hath fine Crimsen satten of 15 shil. the yarde to sell in barter. I demaunde what it is worth in readie money? Ans. Take the $\frac{1}{4}$ of 4 li. 3 s. 4 d. which is 1 li. 10 pence, and abate it from 4 li. 3 s. 4 d. and also from 3 li. 6 s. 8 d, and there resteth 3 li 2 s. 6 d. and 2 li. 5 s. 10 d. for the two first numbers in the rule of 3. And 15 shillings for the thirde number, which 15 shillings is the ouerplus of the yarde of satten: then multiply and diuide and you shall finde 11 shil. and so much did the yarde of Satten cost in readie money.

10. Two Marchaunts will chaunge their marchandise the one with the other

other, the one of them hath tynne of 50 s. the 100 li. weight to sell for readie money, and in barter hee will sell it for 3 li. 6 s. 8 d. and he will gaine after 10 li. vppon the 100, and yet hee will haue also the one halfe in readie money. The other hath Leade of 3 halfepence the li. to sell for readie money. I demaund how he shall sell the pounde of Leade in barter? Answer. See first at 10 li. vpon the 100 li. what the 3 li. $\frac{1}{3}$, will come vnto, in saying by the Rule of three; if 100 giue 110, what will 3 $\frac{1}{3}$ giue? multiplie and diuide, and you shall finde that they will come to 3 li. $\frac{2}{3}$, which is 13 s. 4 d. of the which the halfe which hee demaunded in readie money, is 36 s. and 8 d. the same beeing abated from 50 s. and also from 3 li. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 li. 16 s. 8 d. for the two first numbers in the rule of three, which you muste put all into halfepence, and the aforesaid three halfepence shall be the thirde number, and then multiplie and diuide, and you shall finde 4 d. $\frac{1}{8}$, and for so much shall

he sell the pound of lead in barter.

11. More, two Marchants will exchange their marchandise the one with the other, the one of them hath steele of 16 shil. 8 d. the 100 waight, to sell for readie monie, and in barter he will sell it for 25 s. and yet he loseth after 10 li. in the 100 li. but he will haue the $\frac{1}{2}$ in readie monie: the other hath yron of 6 shil. 8 d. the hundred, to sell in barter, I demaund what the hundred of yron did cost in readie monie? Answere: Say, if 100 come but to 90, how much shall 25 shillings come to? Multiplie & diuide and you shal find 22 shillings 6 d. of the which maner take the $\frac{1}{2}$, which is 11 s. 3 d. and subtract it from 22 s. 6 d. and also from 16 s. 8 d. and there will remaine 11 s. 3 d. and 5 s. 5 d. for the two first numbers in the rule of three, and 6 s. 8 d. which is the ouerprice of a hundred of yron for the third number, then multiplie and diuide, and you shall find 3 s. 2 d. $\frac{14}{27}$: and so much did the hundred of yron cost in readie monie.

12. More, two Marchants will change their marchaundise the one with the other, the one of them hath Saies of 20 s. 10 d. the peece to sell for redie mony, and in barter he will sell the peece for 25 s. and he will haue the $\frac{1}{4}$ in ready monie, the other hath cappes of 35 shillings the dosen to sell for readie monie, but he will gaine after the rate of 10 li. vpon the 100 li. I demaunde how hee shall sell the dosen of caps in barter? Aunswere: say if 100 be woorth 110, What shall 35 s. be worth, which is the iust price of the dosen of caps, multiply and diuide, and you shall find 38 shil. 6 pence. Then take the $\frac{1}{4}$ of 25 shil. which is 6 s. 3 d. and subtract it from 20 shil. 10 d. and also from 25 s. and there will remaine 14 s. 7 d. and 18 s. 9 d. for the two first numbers in the rule of three, and 38 shil. 6 d. which is the iust price with his gaine in the dosen of caps for the third number, then multiplie and diuide, and you shall finde 49 shil. 6 d. and for so much he shall sell the dosen of caps in barter.

The

The 12. Chapter treateth of the exchanging of money from one place to another.

First you must note that at Anwerpe they vse to make their accounts by Deniers de grosse, that is to say, by pence Flemish, whereof 12 doe make 1 s. Flemish, and 20 s. Flemish doe make 1 li. de gros.

Example.

1. If I deliuer in Flaunders 500 li. Flemish, at 19 s. 6 d. de gros, that is to say at 19 s. 6 d. Flemish, to receyue 20 s. at London. I demaund how much I shall receyue sterling at London for the saide 500 li. Flemish? Aunswere: Say if 19 s. $\frac{1}{2}$, giue $\frac{20}{1}$, what will $\frac{500}{1}$ giue? Multiplie and diuide, and you shall finde 512 li. 16 s. 4 d. $\frac{12}{13}$, of a penie. And so much sterling shall I receyue in London for my 500 li. Flemmish.

2. If I deliuer in London 375 li. sterling, to receyue in Anwarpe 21 s. 9 d. the grosse, that is to say Flemish, for euerie pound sterling. I demaund howe many poundes Flemish I shall receyue in Anwarp, for the said 375 li. sterling? Answere, say if $\frac{21}{1}$ giue $21\frac{3}{4}$, what will $\frac{375}{1}$ giue? Multiplie and diuide, and you shall finde 407 li. 16 s. 3 d. So manie pounds Flemish shall I receyue in Anwarpe for the sayde 375 li. sterling in Anwarpe.

3. If I take vp money at Anwarpe, after 19 s. 6 d. Flemish, to pay for the same at London 20 s. ster. and when the day of payment is come, I am forced to returne the same, and to take vp money againe in London, to pay my bill of exchange, so that for 20 s. which I take vp here, I must pay 19 shil. 6. d. at Anwarpe. I demaunde whether I doe winne or loose, and howe much in, or vppon the 100 li. of money? Answer, Say if $19\frac{3}{4}$ giue $19\frac{1}{2}$: what will $\frac{100}{1}$ giue? multiplie and deuide, & you shall

finde

find 98 $\frac{58}{79}$, the which being bated from 100, there will remaine 1 $\frac{21}{73}$. And so much doe I lose vpon the 100 pound of monie.

4. If I take vp at London 20 shil. sterling, to pay at Anwerpe 21 shil. 8 d. Flemish, and when the day of payment is come, my Factor is constrained to take vp money againe at Anwerpe, wherewith to pay the foresaid summe, and there he doth receiue 22 shillinges Flemish, for the which I must pay 20 shillinges at London. Nowe I demaunde whether I doe winne or loose, and how much the 100 li. of monie after the rate? Answere, saye, if 21 $\frac{2}{3}$ giue $\frac{22}{1}$, what will $\frac{100}{1}$ giue? multiply and diuide, and you shall finde 101 $\frac{7}{13}$, from the which abate 100, and there will remaine 1 $\frac{1}{13}$, and so much shall I gayne vpon the 100 pounde of monye.

The exchaunge from London into Fraunce, is not like as it is into Flaunders, but is deliuered by the Frenche

crowne

crowne, which is worth 50 souse tournois the peece.

And heere must you note, that in Fraunce they make their accounte by Deniers Tournois, whereof 12 Deniers maketh 1 souse Tournois, and 20 souse Tournois maketh 1 li. Tournois, which they call liure of Fraunce, & the french crowne is currant among marchaunts, for 51 souse tournois, but by exchaunge it is otherwise, for they will deliuer but 50 Souse Tournois, which is 2 pound 10 souse tournois for a Crowne, and at such price the crowne as the taker vp of monie canne agree with the deliuerer.

Example.

5. If I deliuer 340 li. sterling here in London, after 6 shil. 4 d. sterling the crowne, to receaue at Roan, or at Paris 50 Souse Tournois for euerye Crowne, I would knowe how manye Liures Tournois I shall receaue there for my 340 pound ster, Auns. saye

if 6 s, $\frac{1}{3}$ ster. doe giue mee 2 li. $\frac{1}{2}$ Tournois, what will $\frac{6800}{1}$ s, giue which is ẏ 340 li. reduced into shillinges, then multiplie and diuide, and you shall finde 2684 Lieures $\frac{4}{19}$, which is woorth 4 souse $\frac{4}{19}$ Turnoies, and so much shall I receiue in Roan or Parris for my 344 li. sterling.

6. If I deliuer in Parris or Roan, or else where in Fraunce 1250 Lieures Tournois, at 50 souse Tournois the Crowne, to receyue for euerie such Crowne, 6 s. 3 d. sterling at London. I demaunde how much sterling money I shall receiue at London for my 1250 pounde Tournois? Answere, say if 2 li. $\frac{1}{2}$, doe giue me 6 s. $\frac{1}{4}$, what will $\frac{1250}{1}$ giue? Multiplie and diuide, & you shall finde 3125 shil. sterling, which maketh 156 pound 5 shil. sterling. And so many poundes shall I receyue at London for the sayde 1250 lieures Tournois, after 5 shil. 3 pence for euerie Crowne of 50 souse.

The

The 13. Chapter treateth of the Rule of Allegation or mixture.

The rule of Allegation is ſo named, for that it teacheth to alligate or bind togither diuers parcels of ſundry prices, and to knowe howe much you muſt take of euerie parcell according to the numbers of the queſtion, ẏ which rule is diſtinct into two parts, as followeth.

The firſt part of the rule of Alligation, ſheweth howe to make a mixture of diuers things being of ſundry prices, & of the ſame things ſo mixed, to knowe the common price of the ſaid mixture.

Example.

1. A man woulde mixe 5 buſhelles of weate at 2 s. 8 d. the Buſhell, with 9 buſhels of Rie, at 2 s. the buſhell, and woulde knowe howe much the buſhell

ſo

so mixed doth stand him in the one with the other, Aunswere, for to knowe the same common price, you must multiply euery thing by his price, and adde all the products together, the which you must diuide by the number of all the things that are to be mixed, and the quotient will aunswer to the qnestion, as in the foresaid example, I multiplie 5 bushels by his price, that is to say 2 shil. 8 pence, and thereof commeth 13 shil. 4 pence. Likewise I multiplie 9 bushels by 2 shilling, maketh 18 shil. both these summes added together, doe make 31 s. 4 d. the which I do reduce into pence and they make 376 pence, then I diuide 376 by 14, which is the number of all the bushels, and my quotient will be 20 pence and $\frac{6}{7}$, and so much dooth one bushell of both the sorts of graine stand him in.

2. If you haue two seuerall thinges whereof you woulde mixe equall portions tagither, you must adde their prises and take onely the $\frac{1}{2}$, if you woulde

mixe together equall portions of three thinges, you must take $\frac{1}{3}$, and of 4 the $\frac{1}{4}$, and so continuing as by Example, wheat of 2 s. 8 d. the bushell, and Rye of 2 s. the bushell, being mingled by equall portions, I adde 2 s. 8 d. and 2 s. together, and they make 4 s. 8 pence, whereof the $\frac{1}{2}$ is 2 shillings 4 d. and so much is the value of one bushell of such a mixture, and if there were a portion of barlie at 20 d. then I must adde 2 s. 8 d. 2 shil. and 20 d. together, and they make 6 s. 4 d. whereof the $\frac{1}{3}$, whiche is 2 s. 1 d. $\frac{1}{3}$ should be the price of one bushell of that mixture.

3. A Marchaunt hath 27 li. waighte of large cloues at 6 s. the li. 15 li. of the middle sort at 2 shil. 6 d. the li. And 10 li. of Fuste at 2 s. 2 d the li. When all the same are mixed together, I woulde knowe how much the pound is worth? Answere: You must multiplye euerye droog by his price, and then diuide the totall summe of the productes by the whole waight of the droogs, and you

Y shall

ſhall find 51 d. $\frac{1}{26}$, and ſo much is the li. of that mixture worth.

27 at 6 s. 0 d	162
15 at 2 s. 6 d	37 $\frac{1}{2}$.
10 at 2 s. 2 d	21 $\frac{2}{3}$.
52	221 $\frac{1}{6}$.

4. And if you woulde mixe $\frac{1}{2}$ large cloues, $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of Fuſt, and you woulde knowe howe muche the pounde waight were worth, you muſt take a number which contayneth thoſe partes, as for example 12, whereof the $\frac{1}{2}$ which is 6 ſhall ſignifie ſo manie li. of large cloues: The $\frac{1}{3}$ which is 4, ſhall be ſo many li. of middle, and the $\frac{1}{4}$ whiche is 3, ſhall be ſo many li. of Fuſt. Then afterwardes you muſt multiplie euerie drug by his price, and diuide the totall ſumme of the drugs, and you ſhall finde 4 s, $\frac{1}{26}$. And ſo much is 1 li. waight of the mixture.

6. at 6 s. 0 d.	36
4. at 2 s. 6 d.	10
3. at 2 s. 2 d.	06 $\frac{1}{2}$.
13.	52 $\frac{1}{2}$

5. And if you would make 100 pounde waight of such a mixture, you shall worke by the rule of companie, and you shall find 46 li. $\frac{2}{13}$ of large cloues, 30 li. $\frac{10}{13}$ of middle, and 23 $\frac{1}{13}$ of Fust.

$$\begin{array}{l|l} 6 & \\ 4 & 13. \quad 100 \left\{ \begin{array}{l} 6: \text{ Ans. } 46\frac{2}{13}. \\ 4: \text{ Ans. } 30\frac{10}{13}. \\ 3: \text{ Ans. } 23\frac{1}{13}. \\ \hline \qquad 100. \end{array} \right. \\ 3 & \\ 13 & \end{array}$$

6. A Goldsmith hath 8 li. waight of siluer billion of 7 ounces fine, more 15 li. of 8 ounces $\frac{1}{2}$, fine, & 13 li. waighte of 10 ounces fine, and he will melt all these togeather, and make of them one masse. The question is to knowe of what finenesse the pounde waight is? Aunswere, you must multiplie the number of the waightes of euerie Billion, by his finenesse, and therof wil come the

ounces and partes of ounces fine, the which you must adde together, and they will make 313 ounces $\frac{1}{2}$ of fine, the same you must diuide by 36, which is the whole summe of the pound waight of Billion, and you shall finde 8 ounces and $\frac{51}{72}$ remaining, which $\frac{51}{72}$ partes of an ounce is worth 14 penie waight, and 4 graines, and so much is the pounde waight of this mixture worth.

8 lib.	at 7 onz.	is 56.
15	at 8 onz. $\frac{1}{2}$	is 127 $\frac{1}{2}$.
13	at 10 onz.	is 130
36		313 $\frac{1}{2}$.

7. A Goldsmith hath three sortes of Siluer billions, that is to saye, 5 li. 7 ounces 10 penie waight, at 7 ounces $\frac{1}{2}$ fine, 12 li. 3 ounces, at 6 ounces $\frac{1}{3}$ fine, and 4 li. at 9 ounces fine, all the which he will melt into one masse. The question is to know, of what finenesse the pound waight of that mixture shall be? Answere, you must multiplie euery billion by his finenesse as afore, and adde toge-

together all the products, and they doe amount to 155 li. $\frac{37}{48}$. Then adde all the waights of the Billions together into one summe, and they make 21 li. $\frac{7}{8}$: diuide then 155 $\frac{37}{48}$ by 21 $\frac{7}{8}$, & your quotient 7 ounc, and $\frac{1016}{8400}$ remayning the which $\frac{1016}{8400}$ being brought into penie waights or graines, doe gaine two penie waight 10 grains, $\frac{7}{35}$ of a graine fine. So you may perceiue that the same mixture is of 7 ounc. 2 pence, 10 graines, and $\frac{2}{35}$ of a graine fine, the li. waight.

And here is to be noted that the reckoning of the waights for Syluer, is thus as followeth, that is to say.

1 li. of Troye waight maketh twelue ounces.

1 Ounce is diuided into 20 pennies waight.

1 Pennie waight is distributed into 14 grains.

1 Graine into 20 smaller partes, &c.

And the reckoning for Golde is thus,

1 Ounce of fine gold without any alloy, is imagined to be 24 karets.

1 Karet is diuided into 4 graines.

1 Graine is parted into two halfe graines or 5 quarters of a grayne, &c.

And so into other smaller parts.

8. But if the sayd Goldsmith would put 5 pound waight of Copper with the sayd Billions, and you woulde knowe of what finenesse it is, then must you ad the same 5 li. with the 21 li. $\frac{7}{8}$, and it maketh 26 $\frac{7}{8}$. Then diuide the aforesayd 155 li. $\frac{37}{48}$, by 26 li. $\frac{7}{8}$, and you shall finde 5 ounces fine, and $\frac{8216}{10320}$ remayning, the which $\frac{8216}{10320}$ is woorth 15 penie waight 22 graynes, and $\frac{6}{43}$ and of that fines will the same masse bee.

9. A Goldsmith hath melted 12 li. waighte, and fiue ounces of Golde Billion, being of 18 karets fine, with foure pound waight 4 ounces and $\frac{1}{2}$ at 21 karets fine, I demaund of what finenesse is 1 li. waight of the same masse? Auns.

you

you must multiplye the waightes (by the karets fine) of each sort, and add the products together, the same you must diuide by the whole summe of al the waightes added together, and youre quotient will shew you of what finenes the same is of, as in the former example I do multiplie 12 li. and 5 ounces by 18 karets, and thereof commeth 223 karets $\frac{1}{2}$. Likewise I doe multiplie 4 li. waight, 4 ounces $\frac{1}{2}$, by 21 karets, and thereof commeth 91 karettes $\frac{7}{8}$, these two summes of karettes I doe adde together, and they make 315 karettes $\frac{3}{8}$. Then I do adde 12 li. waight 5 ounce, and 4 li. waight, 4 ounces and $\frac{1}{2}$ together, & they make 16 li. 9 ounces, $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{19}{24}$ partes of a pound: and therefore I diuide 315 $\frac{3}{8}$, by 16 li, $\frac{19}{24}$, and thereof commeth 18 karets, and $\frac{2520}{3224}$ remaining, which fraction is 3 graines, and $\frac{51}{403}$ partes of a graine. And of that fiacnesse is 1 li. waight of the said masse.

A Goldesmith hath melted 10 li. waight, 7 ounces, and $\frac{3}{8}$ of 20 karettes

and $\frac{1}{3}$ fine, and 8 li. waight 2 ounces, and $\frac{5}{6}$ partes of 23 karets fine, with 15 li. waight, 1 ounce of Siluer. The question is of what fines is the li. waight of the sayd masse? Answere: You must multiplye the waight of euery sorte of Golde Billion by his alloye, that is to say by his finenesse, and adde al the products together, and you shall finde 340 karets $\frac{25}{432}$, then adde the waighte of the two sorts of Golde billion, with the waight of the siluer together, and therof wil come 33 pound 11 ounces $\frac{5}{25}$, the which 11 ounces $\frac{5}{24}$ is $\frac{269}{288}$ of a pounde waight, then diuide the sayd 340 karets $\frac{25}{52}$ parts, by 33 pounds $\frac{369}{288}$, and you shall finde 10 karets $\frac{4205}{203871}$. And of the same finenesse shall the li. waight of that masse of Gold be.

The second part of the rule of Allegation.

1. A Goldsmith hath 4 sortes of Gold the first is woorth thirtye Crownes the pound waight, the seconde is worth 36 crowns

crownes, and the thirde is woorth 42 crownes, and the fourth is woorth 45 crownes: and of these 4 sortes hee will make a Scepter of 6 pound waighte, which shall be woorth 40 crownes the pounde. I demaunde howe muche hee must take of euery sorte? Answere, first you must set down the numbers whereof you will make the Allegation, which are 3,36,42, and 45, orderlye the one vnder the other, after the same manner as if you woulde adde them together: and the common number whereunto you will reduce them, you shall set on the lefte hand, which common number in this Example is 40. Then marke which of the said foure numbers are lesser then that common number, and which of them be greater, and with a drought of your penne, euermore linke two numbers together, so that the one bee lesser then that common number, & the other greater than it, for two greater, nor two smaller numbers may not bee linked together, for they will eyther be lesser or else greater than the com-

common number: but one greater number and one smaller may be so mixed, that they will make the common number. And two greater or two smaller numbers can neuer make the common number in due order, as hereafter shall appeare.

After that you haue thus linked them then marke howe muche ech of the lesser numbers is smaller than the common number, and that difference you shall set against the greater numbers which bee linked with those smaller, each of them with his match still on the righte hande. And likewise you must set the excesse of the greater numbers against the lesser which bee combined with them. Then shall you adde all those differences into one summe, which shall be the first number in the rule of three, and the seconde number shalbe the whole massie peece, that you will haue of all the particulars, which in this example was presupposed to be 6 xi. Then the thirde summe shall bee each difference by it selfe, and by them shall

ſhall you finde out the fourth number, declaring the iuſt portion that you ſhall take of euerye particular in that mixture, as now by the former Example I will make it more plaine.

The common price or number.		The prices ſeuerall.	The differences.	
	40	30	5	A
		36	2	B
		42	4	C
		45	10	D
			21	

21. 6. 5. || 21. 6. 2.

21. 6. 4. || 21. 6. 10.

Here in this former Example, you ſee that I haue ſet downe the ſeuerall prices, which bee 30, 36, 42, 45, and haue linked together 30 with 45, and 36 with 42. The common price 40, I haue ſette on the left ſide, as before is declared, & the difference of it from

euery

euerye seuerall price I haue set on the right hande againste that summe with the which it is linked. So the difference of 30 from 40 is 10, which I set against 35 that he is linked withall, & ỷ difference of 45 aboue 40 is 5, which I haue set against 30. So likewise the difference of 42 aboue 40 is 2, that I haue set against 36, and the difference betweene 36 and 40, which is 4, I haue sette against 42, then I adde all those differences together, namely 5, 2 4, and 10, and they make 21, which I make the first number in the rule of 3, and 6 pounde which is the waighte of the Scepter of Gold the seconde number, and the thirde number shall bee euery particular difference for euery seuerall working. Then worke by the rule of three, sayeng if 21 (which is all the differences added together) do giue me 6 li. waight, which is the waight of the Scepter, what shall 5 giue, which is the first difference?

I multiply and diuide, and I finde 1 li.

ri. waight $\frac{1}{7}$, so much must I haue of the first price, then I do in like maner with the rest, and I finde $\frac{4}{7}$ of a ri. waighte of the second price, 1 ri. $\frac{1}{7}$ of the third price and 2 ri. $\frac{6}{7}$ of the fourth, the which foure summes being added together, do make 6 pound, which is the whole waighte of the Scepter that I would haue. And nowe to prooue if the prices doe agree, you shall doe thus, first multiplie this totall summe 6 by the common price 40, and it will make 240 Crownes, which you shall keepe by it selfe. And afterwarde multiplie euerye seuerall summe of waight by the price belonging vnto the same waight, and if that summe do agree with the first that you keepe by it selfe, then is your work well done, as here 1 ri. $\frac{1}{7}$ is the waight of the sort of Golde which is of 30 Crownes price. Therefore multiplie 30 by 1 ri. $\frac{1}{7}$, and it maketh 40 crownes $\frac{6}{7}$, whiche you must set downe: Then multiply $\frac{4}{7}$ (which is the waighte of the seconde sorte of Golde) by 36, which is the price of the same, and thereof commeth

20 crownes $\frac{4}{7}$: so againe 1 li. $\frac{1}{7}$, multiplied by 42 Crownes, which is the thirde price, doeth make 48 Crownes. And last of all 2 li. $\frac{6}{7}$, multiplied by 45 maketh 128 Crownes $\frac{4}{7}$. All these being added together, doe make 240 Crownes, agreeable to the former sum of 40, multiplyed by 6, and thus I maye affirme that his worke is well done.

2. A Tauerner hath foure sortes of wine, of foure seuerall prices, the firste of 8 pence the Gallonde, the seconde of 10 pence the Gallonde, the thirde of 15 pence, and the fourth of 18 pence: and hee will mixe all these sortes together, so that the Gallonde shall be worth but 12 pence. I demaunde how many gallonds he must take of euerie sort. Ans. First suppose the punchen to holde some certaine measure, as to contayne 84 gallonds, and then the forme will be after this sort, as you see hereafter following.

	8	3
	10	6
12	15	4
	18	2
		15

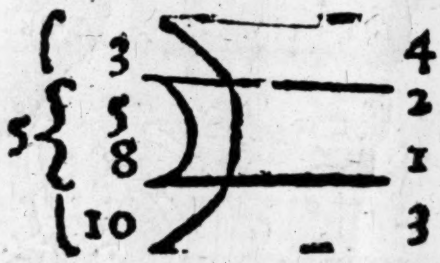
If 15 doe giue 84.

What will 3.	giue?	16 $\frac{4}{5}$ of the 1.
What will 6.	They	33 $\frac{3}{5}$ of the 2.
What will 4.	make	22 $\frac{2}{5}$ of the 3.
What will 2.		11 $\frac{1}{5}$ of the 4.

3. A mint maiſter hath 4 ſortes of ſiluer Billion, of theſe fineſſe following. The firſt is of 3 ounces fine, the ſecond of 5 ounces fine, the thirde of 8 ounces fine, and the fourth of 10 ounces fine. And of all theſe 4 ſortes, he would make another ſorte, that ſhould bee but of 6 ounc. fine, the queſtion is to knowe what portion hee muſt take of euerie of the ſaid billions? Anſwere: Set downe ye particular finenes, the one vnder the other, namely, 3, 5, 8, and 10, and ſet 4

which

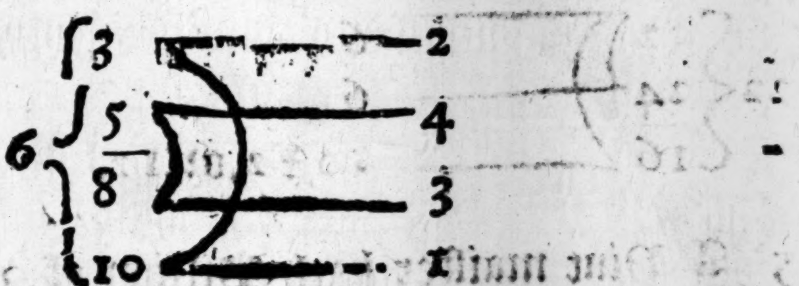
which is the common finenesse, before them toward your left hand, as here you may see.



Then put the difference of 3 from 6 right against 10, and the difference of 6 from 10, which is 4 righte against 3, and the difference of 5 from 6, which is 1 right against 8: and the difference of 6 from 1 which is 2, righte againste 5. This done, you shall conclude that for every 4 pound waight that hee taketh of the Billion of three ounces fine, he must take 5 li. of the billion of 5 ounces fine, and 1 li. waighte of the billion of 8 ounces fine, and 3 li. waight of that which is of 10 ounces fine. Or else if you please, adde 4, 2, 1, and 3 together, and they make 10, which shall bee the Denominator of everye of the portions

that

that is to say, you shall take $\frac{4}{10}$ of the billion of 3 ounces fine, $\frac{2}{10}$ of the which is of 5 ounc. fine $\frac{1}{10}$ of that of 8 ounces fine, and $\frac{3}{10}$ of that which is of 10 ounces fine. And so of all such like. And if you woulde make 60 li. waight of such a mixture, you must adde 4, 2, 1, and 3, together, which maketh 10, and then worke by the rule of companie, saying, if 10 li. giue 60 li. what will 4 giue? and so likewise what will 2 giue, &c. This forme may bee varyed by combining the particular values after this maner as here you doe see, and as in the other example, it is plaine.



4. Sometimes the valure doth change his difference, and is linked vnto diuerse, for to represent the portion that is to be taken of euerie thing, as by ex-

ample. A marchant hath wheat of 2 s. 8 d, the buſhel, Rie of 2 s, and Barley of 16 d. the buſhell, and hee will make a mixture of theſe ſorts which ſhall ſtand him but in 22 pence the buſhell. It is demaunded howe much hee maye take of euerie ſort of the ſayde grayne? Aunſwere. Put the difference of 22 from 32, and 24 right againſt the 16. And likewiſe the difference of 16 from 22 right againſt 32 & againſt 24. And you ſhall finde for 6 buſhels that hee taketh of wheate, hee muſt take 6 buſhels of Rie, and 12 buſhels of Barley.

	d.	
22	32	6
	24	6
	16	10 & 2, or 12.

5 A Mint maiſter hath Billion of 9 ounces 10 penie waight fine, and of the ſame he woulde make money, which ſhould bee but of 6 ounces fine, & therefore it behooueth him to melt Copper

therewith

therewith, which is valued at 0 penie waighte of fine. The question is to knowe how much siluer and copper hee muste mixe together? After that you haue put downe 9 ounces, $\frac{1}{2}$ for the value of the siluer, and right vnder the same, 0 for the Copper, you must take the difference of 6 from 9 $\frac{1}{2}$ which is 3 $\frac{1}{2}$, and place the same summe right agaynst the 0, for to signifie the portion of copper that he must take: And the difference of 0, from 6, is 6: the same you must sette right agaynst 9 $\frac{1}{2}$, which shall represent the portion of Siluer that hee must take. And thus you see that for 6 ri. of Siluer that hee taketh, he must take 3 ri. $\frac{1}{2}$ of Copper, to make the same money of 6 ounces fine.

$$6\left\{\begin{array}{l} 9\frac{1}{2} \text{ —— } 6 \text{ ri. sil.} \\ \\ 0 \text{ —— } 3 \text{ ri.} \frac{1}{2} \text{ cop.} \end{array}\right.$$

And if hee had three sortes of Siluer Billion, that is to say, of 6 ounces fine: of 7 ounces fine, and of 9 ounces fine, and hee woulde make money thereof,

which ſhould bee but of 5 ounces fine, it behoueth him to mixe copper there-with. And this forme following doeth ſhewe howe the ſame muſt bee combined, and likewiſe howe much hee muſt take of euerie ſort.

5 { 6 — 5
7 — 5
9 — 5
0 — 1, 2, 4 all is 7.

6 Likewiſe, a Mint mayſter hath Billion of Golde, at 9 karettes fine, ſome at 22 karettes fine, ſome at 24 karettes, which is full fine without corruption, and hee will make coyne thereof, which ſhall bee of 23 karettes fine, it is demaunded how much he muſt take of euery ſort ? Aunſwere : make your Allegation as this forme hereunder ſheweth.

23 { 19 — 1
22 — 1
24 — 4, 1, all is 5.

More, the sayde maister hath Golde of 20 karettes $\frac{1}{2}$ fine, and of 22 karettes fine, and hee will allay the same to 18 karettes fine. And for to doe the same, it is conuenient for him to mixe siluer therewith, which is esteemed at 0 karettes fine: but proceeding according to this Rule, hee shall finde that for 18 pounde waight, or other portions that hee taketh of the 2 sortes of Billion of Golde, hee must take 6 ri. waight, and $\frac{1}{2}$ of Siluer, to allay the same vnto 18 karets fine.

$$11\left\{\begin{array}{l} 18 \text{ ——— } 18 \\ 22 \text{ ——— } 18 \\ 0 \text{ ——— } 2\tfrac{1}{2},4 \text{ that is } 6\tfrac{1}{2}. \end{array}\right.$$ Note.

7 Againe, the sayde maister hath 100 pounde waight of Gold at 22 karettes fine, and 20 pounde waight at 19 karets fine. The which hee will allay to 20 karets fine. The question is whether hee ought to mixe any siluer with the same, yea or no, and howe much?

Answere: you must consider (by the first part of the rule of Alligation) the alloy of the 100 li. and of the 200 li. being melted together, and you shall finde that the same is of 21 $\frac{1}{2}$ karets fine, and therefore for as much as the same is yet of a better finenesse then hee woulde haue it, hee must therefore mixe siluer therewith, that is to say, for 20 pounde waight, or portions of Golde, hee must take thereto 1 li. $\frac{1}{2}$ of siluer.

$$20\left\{\begin{array}{ll} 21\frac{1}{2} & 20 \\ \text{—} & 1\frac{1}{2}. \end{array}\right.$$

8. If hee had 1 li. waight fine siluer of 12 ounces fine, I demaunde howe much Copper hee must mixe with the same to allay it vnto 11 ounces $\frac{3}{4}$ fine, that is to say, to 11 ounces fiue penie waight fine: make your Alligation as before is taught. Then diuide the portion of Copper, by the portion of fine, and you shall finde $\frac{3}{45}$, which beeing abbreuyed, is $\frac{1}{15}$. And thus to euery li.

waight

waight of ſiluer, you muſt take $\frac{1}{15}$ of a ri. of Copper, and for euerie 11 pound $\frac{1}{4}$ of ſiluer, you muſt take $\frac{3}{4}$ of a ri, of Copper. And ſo is to bee done with the ſame, in caſe that it were of any other alloy.

9. A maiſter hath 1 ri. of fine Golde, of 24 karets fine, the which he woulde allay to 22 karetts fine. The queſtion is to knowe howe much ſiluer muſt bee mixed with the ſame, that it may bee of the fineneſſe of 22 karets before? Anſ. take the difference of 22 to 24, which is 2. Then diuide 2 by 22, which you cannot, for they are $\frac{2}{22}$, but abbreuie them, and it is $\frac{1}{11}$. And ſo much ſiluer muſt bee mixed with 1 ri. waight of fine Golde, that the ſame may be of 22 karets fine.

10 A Goldſmith hath 1 ri. waight of ſiluer billion of ſeuen ounces fine, it is demaunded howe much fine ſiluer hee muſt put to the ſame, that beeing molten together, it maye bee of 10 ounces

fine. Answere, Make your alligation of 7, and 12 vnto 10. and then diuide the portion of the fine siluer, by the portion of siluer billion, and you shall finde 1 $\frac{1}{2}$: and thus to 1 pound waight of 7 ounces fine, you must take 1 li. $\frac{1}{2}$ of fine siluer of 12 ounces fine, to make the same of 10 ounces fine.

11 A Marchaunt hath giuen order vnto his factor, to employe him 83 li. 6 s. 8 d sterling in 5 sorts of spices, that is to say, in Nutmegs, of 80 d. ye pound, Cloues at 76 d. the pounde, Sinamon at 52 d. the pounde, Ginger at 34 d. the pound, and Pepper at 30 d. the pounde. But hee hath not appointed him the quantitie or portion which hee shoulde buy of euery sort, neither yet of all the sorts together, the question is to knowe how much the factor must buy of euerie sort to haue of eche of them like quantitie. Answere: you must adde 80, 76, 52 34, and 30 together, and they make 272. Then you must diuide. 83 li. 6 s. 8 d. beeing reduced into pence, name-

ly

ly 20000 d. by 272, & thereof commeth 73 li. $\frac{0}{17}$. And so many poundes muste he buy of euery sort of the said spices.

12 But in case hee woulde not haue so many poundes of the one sorte, as hee woulde haue of the other, then you must take another middle valure, betweene the sayde particulars: as for example, let the meane number be 50 d. Then reduce the saide 83 li. 6 s. 8 d. into pence, as the other prices are, & they doe make 20000 pence, the same you must diuide by 50 pence, which is the meane or common price, and therof will come 400 li. And so manye poundes must he haue of all the sortes togither. Then if yee will knowe howe manie poundes he must haue of euery sort, you must set downe your particular prises, after the middle valure, that is to say, after 50 d. as hereafter followeth: And then worke by the rule of companie, and you shall find how much he shall buy of euery sort.

50

50	80	20	
	76	16	
	52	16	
	34	26 & 2, all is 28.	
	30	30	
		110	

110 giue, 400 what
20: Ans. 72 $\frac{8}{11}$
16: Ans. 58 $\frac{2}{11}$
16: Ans. 58 $\frac{2}{11}$
28: Ans. 101 $\frac{9}{11}$
30: Ans. 109 $\frac{1}{11}$
400

The 12 Chapter treateth of the Rule of falshoode, or false positions.

The rule of falshoode is so named, not for that it teacheth anie deceyte or falsehoode, but that by feyned numbers taken at all aduentures, it teacheth to finde out the true number that is demaunded. And this (of all the vulgar Rules which are in practise) is the most

most excellent, this Rule hath twoo partes, the one is of one false position alone, the other is of twoo positions, as hereafter shal appeare.

Those questions which are done by false positions, haue their operations in a maner like vnto that of the rule of three: but onely that in the rule of three, we haue three numbers knowen, and here in this rule wee haue but one number that commeth in vse to worke by: vnto the likenesse whereof we must deuise two other numbers, the one multiplying, and the other diuiding, as by example.

1 I haue deliuered to a banker, a certaine summe of poundes in money, to haue of him by the yeare simplie, 6. li. vppon the 100 li. And at the ende of 10 yeares, hee payed me 500 li. for all, both principall and gaine. I demaunde howe much was the principall summe that I deliuered him at the first? Here you see that there are diuerse tearmes: but the chiefe to worke withall is 500 li.

li. which commeth of the other numbers, that is to say, of 10, and 100, for of them is composed or made the tenor of the question, the practise whereof is thus.

Let vs feyne a number at pleasure, and with the same let vs make our discourse, euen as though it were the principall summe that we seeke for. As by example. Suppose that I deliuered him at the first, 200 pound, the which were worth to me in 10 yeares, 120 li. after the rate of 6 li. vppon the 100 li. Then 120 pound added with 200 li. do make but 320 pound, and I must haue 500 li. Thus you see that I haue three tearmes for the rule of three: the one which shall containe the question: the other two which I haue formed artificially, which are 200, and 320: in such sort, that 320, ought to haue such proportion to 200, as 500 hath vnto the number that I seeke: that is to say, vnto the true principall summe: then must I haue recourse vnto the Rule of three after this sort, saying.

Baker, H.

If 320 li. bee come of 200 li. of howe much shall come 500 li. I do multiplie 500 by 200, and they are 10000, the which I must diuide by 320 pound, and thereof commeth 312 li. $\frac{1}{2}$, which is the summe that I deliuered at the first. And thus this rule hath some congruence with the double rule of three.

2 I haue a Cesterne with 3 vnequall cockes, contayning 60 pipes of water: And if the greatest cocke be opened, the water will voyde cleane in 1 hower: at the 2 it will auoyde in two howers: and at the third it wil require three howers. Nowe I demaunde in what space it will auoyde, all the cockes beeing set open? Aunswere. Suppose that it will auoyde in halfe an hower: that is to say, in 30 minutes. Then must there auoyde at the first cocke the $\frac{1}{2}$, which is 30 pypes: and by the seconde cocke the $\frac{1}{4}$, which is 15 pypes, and by the third cocke the $\frac{1}{6}$, that is 10 pypes: all the which summes beeing added together, doe make 55 pypes: but it should

should be 60 pipes. Therefore say by the Rule of three, if 55 pipes doe voyde in 30 minutes: in howe many minutes will 60 pipes voide? multiplie and diuide, and you shall finde 32 minutes $\frac{40}{55}$ the which $\frac{40}{55}$ beeing abbreuied, are $\frac{8}{11}$ of a minute, and in that space will the water void if all the cocks be set open.

Of the rule of two false positions.

A rule.

The summe of this Rule of two false positions is thus, when anie question is proponed appertayning to this Rule. First, you must imagine anie number at your pleasure, which you shall name the firste position, and with the same shall you worke in steede of the true number, as the question dooth importe: and if you see that you haue missed of the true number that you doe seeke: Then is the last number of the worke, either too great or too little, the which number, you shall note with the signe of more or lesse for

for that is the firſt errour in the which, you haue fayled, the which ſignes of more, and leſſe, ſhal be noted with theſe figures —|—, ——, This figure —|— betokeneth more: and this plaine line ——, ſignifieth leſſe: that is to ſay the one ſignifieth too much, and the other too little: then you muſt begin againe, and take another number, which ſhalbe the ſeconde poſition, and worke by the queſtion as before, if you haue fayled again, note the exceſſe or want, for that is the ſeconde errour. Then ſhall you multiply the firſt poſition by the ſecond error croſſewiſe, and againe the ſecond poſition by the firſt errour, (and this muſte alwayes bee obſerued) and you muſt keepe the two productes: then if the ſignes bee both like, that is to ſay, either both too muche, or both too little, you ſhall abate the leſſer producte from the greater: and likewiſe, you ſhal ſubſtract the leſſer error from the greater, and by the remaine of thoſe errors you ſhall diuide the reſidue of the products, the quotient ſhall bee the true

number that you seeke. But if the two signes be vnlike, that is to say, the one too much, and the other too little, then you shall adde those productes together, and likewise you must add both the errours together, and by the summe of those errours, diuide the total summe of both the products: the quotient shall be the true number that you do seeke, and this is the whole rule, as by these examples following, it will appeare more plaine.

Example.

3. A man lying at the poynt of death, sayd that he had in a certaine coffer 100 Duckets, the which he bequeathed to three of his friends by him named after this sort. The firste muste haue a certaine portion. The second must haue twise so many as the first, abating 8 Duckets: and the third must haue three tymes as many as the first lesse by 15 Duckets. Now I demaund howe many euerie of them must haue?

Answere,

Anſwere: firſt I do imagin that the firſt man had 30 Duckets, then by the order of the queſtion, the ſecond ſhoulde haue 52, and the third 75. Theſe three ſummes beeing added togeather, doe make 157, and I ſhould haue but 100 ſo that this firſt errour is too much by 75: then I note apart the firſt poſition 30, with his errour 57 too much, after this ſort 30, —|— 57. Therfore I proſecute my worke, and I ſuppoſe that the firſt had 24, theu by the order of the queſtion, the ſeconde ſhould haue 40, and the third 57: theſe three ſummes being added togeather, doe make 121, and I muſt haue but 100: ſo the ſecond errour is too much by 21. Therefore I note 24 —|— 21, vnder the 30, —|— 57, which was my firſt poſition, which the error as you may ſee in the work on the next ſide following.

Then I multiply croſſewayes 30 (which is the firſte poſition) by 21, which is the ſeconde errour, and thereof commeth 630. Likewiſe I multiply 24, (which is the ſecond poſition)

by 57 which is the first error, and I finde 1368: then because the signes of the error are bothe like: that is to saye, bothe in muche, I must therfore subtract 630 frō 1368 and there will remaine 738 which is ẏ divident: againe, I must subtract ẏ lesser errour from the greater, that is to say 21 out of 57, and there will remaine 36, which shall bee my divisor. This done, I divide 738 by 36, and the quotient will bee $20\frac{1}{2}$.

630	
20	57
24	21
1368	36
630	
738	

$20\frac{1}{2}$
33
$46\frac{1}{2}$
100

11
~~738~~
~~366~~ ($20\frac{1}{2}$.
~~3~~

The

The which $20\frac{1}{2}$ is the iuſt number of the Duckets that the firſt man had for his parte, ſo conſequentlye the ſecond man had 33 Duckets, and the thirde $46\frac{1}{2}$, as by the working afore maye appeare.

The like number will alſo appeare in caſe the errours were both too little, as in making the two poſitions by 18, and 20 & you ſhall finde that ẏ two errors wil be both too little, ẏ firſt will be too little by 15, and the ſeconde too little by 3, as by peruſing of this worke, you ſhall well perceiue.

54
18 — 15
20 — 3
300 12
54
246
246 (20½.
122
1

Agayne, if one of the errors were too

 much

much, and the other too little, yet you shall haue the true number, as before. As if the two positions were 24, and 20, you shall finde that the first errour will be 21 too much, and the seconde will be 3 too little. Therefore multiply 24 by 3 crossewayes, thereof commeth 72.

Likewise multiply 20 by 21, the product will be 420. These two summes 72, and 420, you shall adde together, because the signes of the errors be vnlike, and they make 492, ẏ which shall be your diuident, and againe, adde the lesser error 3 with ẏ greater error 21, and they make 24, for your diuisor,

```
72
        21
20 —— 3.
420.  24.
72.
492  |  1
     |  4̸9̸ 2
     |  2̸4̸4̸ (20 1/2
     |  2̸
```

then

then diuide 492 by 24, the quotient will bee 20 $\frac{1}{2}$: as before doth plainlie appeare.

And now because you shall not forget this part of the rule, learne this briefe remembrance following.

The signes both like substraction do require,
And vnlike signes, addition will desire:

The meaning whereof is thus, if both the errours haue like signes, then muste the diuident and the diuisor bee made by substraction, as is taught before, and if those signes be vnlike, then must you by addition gather the diuidend, and the diuisor, as I haue done in this last example.

Another example.

4 A man hath two siluer cuppes of vnequall waight, hauing to them both but one couer, the waight whereof is 5 ounces, if the couer bee put to the lesser cuppe, it will bee in double proportion

vnto the waight of the greater, and the Couer being putte to the greater cuppe, it will be in triple proportion, vnto the waight of the lesser. I demaunde what was the waight of euery Cuppe? Answere: Suppose that the lesser Cuppe did weigh 7 ounces, then with the Couer it must weigh 12 ounces, and this waight shoulde bee in double proportion vnto the greater, therefore the greater must weigh but 6 Ounces, adde vnto it 5 ounces for the Couer, all will bee 11 ounces, but it shoulde bee 21, for to haue it in triple proportion vnto 7. which representeth the waight of the lesser Cuppe, so that this

105

7 — 10.

9 — 15.

90. 5

105

90. 18. (3 ounces.

15 8

this first error is too little by 10, which you shall note after 7 in this sorte, 7,—10.

And you shall suppose some other number, as 9, and make the like worke as before, so you shall finde 15 too little for the seconde errour, which you shall put behinde 9, with the signe lesse thus, —15, and then worke with the reste as aboue is sayde, and you shall finde that the lesser Cuppe weighed three ounces, and consequently the greater foure ounces.

5 One man demaunded of another in a morning, what a clocke it was. the other made him this answere, if you doe adde (sayeth hee) the $\frac{1}{4}$ of the howers which bee past since midnight, with the $\frac{2}{3}$ of the howers which are to come untill noone, you shall haue the iust hower, that is to say, you shall know what a clocke it was. Answere: Suppose that it was 4 a clocke in the morning, so shoulde there remaine 8 untill noone, then I take the $\frac{1}{4}$ of 4,

which is 1, and the $\frac{2}{3}$ of 8, which is 5 $\frac{1}{3}$, and I add them together, so I find 6 $\frac{1}{3}$, and I supposed but 4, therefore this first error is too much by 2 $\frac{1}{3}$, which I note after my position, thus 4 ✕ 2 $\frac{1}{3}$ then againe I suppose another number, that is to say 9: so should remaine but 3 howers untill noone. I take the $\frac{1}{4}$ of 9, and the $\frac{2}{3}$ of 3, which is 2$\frac{1}{4}$ and 2: these I adde togither, and they make 4 $\frac{1}{4}$: but I supposed that it was 9, therfore the second errour is 4 $\frac{3}{4}$ to little, whiche I note behinde my Position thus. 9——4 $\frac{3}{4}$.

And then I multiply crossewise, as before is taught, and bicause the signes of the errors are unlike, that is to saye, the one too much, and the other too little, therefore in this worke I must adde the products, and they

19

4 ✕ 2 $\frac{1}{3}$.

9 —— 4 $\frac{3}{4}$.

21 7 $\frac{1}{12}$.

19

40

they will be 40. Likewise I must adde the errours, and they be $7\frac{1}{12}$. Then I diuide 40 by $7\frac{1}{12}$, and therof commeth 5 howers $\frac{11}{17}$, and that hower it was in the morning.

The 15 Chapter treateth of diuers questions extraordinarie, euery one of them containing a generall rule for such like examples.

1 FIue men diuising of their ages. The first said to the others, ŷ he was 120 yeres of age. The second said if my yeares were doubled, then should I haue so many yeares more then the first man, as the first hath nowe more then I haue: The thirde sayde in like maner, if my yeares were tripled. The fourth sayde if my yeares were quadrupled, that is to say multiplied by 4: the fifth sayde, that if his yeares were quintupled, that is to say multiplyed by 5, that they should each of them haue so many yeares more then the first man as

as hee hath nowe more then euerie one of them. The question is to know, howe olde euerie of the other 4 men were? Answere. You must take the numbers which are neerest collaterals, in naturall order vnto 2, 3, 4, and 5, by reason of dupling, tripling, &c. And the greater of euerie of the sayde numbers collaterals, must be your Denominator, to the lesser number, As thus, the next collaterall numbers vnto 2, are 1 & 3, which is $\frac{1}{3}$. Likewise the next collateral numbers to 3 are 2, & 4, which is $\frac{2}{4}$, and so for 5, are 2, & 5, which are $\frac{3}{5}$, and for 5 are 3, and 6, which bee $\frac{4}{6}$, Then if you will knowe the seconde mans age, you must adde vnto 120, the $\frac{1}{3}$ of it selfe which is 40, all is 160, the same you must diuide by 2, and thereof commeth 80 yeares, so olde was the seconde man. And for to knowe the age of the thirde man: you must adde vnto 120 his owne $\frac{2}{4}$, that is to saye, his $\frac{1}{2}$, which is 60: And they make 810. The saide summe you must diuide by 3, and thereof commeth 60 yeares

for

for the thirde mans age, and after the same manner you shall finde that the fourth man had 48 yeares, and the fifth had 40 yeares. The proofe is verye easie.

2 A man hauing his eye sight somewhat altered, began to tell and reckon a certaine number of byrdes to bee in all 18. His Companion that had a clearer sight, beholding well the birds, aunswered him, that there were not 18, but sayde he, if there were twise so many more as they are, there shoulde be as many more aboue 18, as there be now lesse then 18. The question is to knowe, howe manye birdes there were in all? Answere, you must adde vnto 18 his $\frac{2}{4}$, that is to say his $\frac{1}{2}$, and thereof will come 27, the which you shall diuide by 3, and thereof commeth 9. And so many birdes there were in all.

3 A Draper hath bought 24 sorting clothes, and he hath solde 100 poundes worth

worth the same clothes vpon the which hee hath gayned as much as one cloth did cost him. I demaunde what one of the said clothes did cost him? Answere, you must adde 1 vnto 24, and they make 25. Then diuide 100 by 25, and thereof will come 4 li. and so much did one cloth cost him.

4 A mayde carryed egges vnto the market, and it happened a merrie fellowe to meete her, who began to ieast with her, in such sort, that hee ouerthrewe her Basket, and brake all her egges: the mayde beeing much displeased with him for breaking of the same, sayd very earnestly vnto him that he should pay for them: the man considering with himselfe, that by his follye they were broken, answered the mayde, that hee woulde pay her for them, and therefore hee demaunded of her, what number she had: the silly poore wench that coulde not well reckon, sayde vnto him, that shee coulde not well tell him, but sayd she, when I did put them
into

into my Basket by 2, and by 2, there remained 1 egge: and when I counted them by 3 and by 3, there remayned 1, and when I did reckon them by 4 and by 4, there remayned stil one: but when I did count them by 5 and by 5, there remayned none. The question is to knowe, howe many egges the mayd had in all? Answere, For to doe this, and all such like questions, you muste multiplie 2,3, and 4, together, saying, 2 times 3 make 6, and 6 times 4 make 24, vnto this number you must adde 1, and they make 25. And so many egges she had in all. But if she had had a greater number of egges, that shee might haue counted them till shee came to 7 & 7, after the same maner as she did, till she came to 5 and 5: you must multiply these numbers 2,3,4,5, and 6, the one by the other, and thereof wil come 720, vnto the which adde 1, and they make 721. And so many egges shee should haue had if she had counted them by 7 and 7.

5. Againe

5 Againe, if shee had sayde that when she counted her egges by 2 and 2, there remayned 1, and by 3 and 3, there remayned 2, and by 4 and 4, there remayned 3: and by 5 and 5, there remained nothing, the question is to knowe howe many egges she should haue had? Answere: you must finde a number, the least that you can possible, which may be diuided by 2, by 3, and by 4, that is to say, 12 is the nearest number: diuide the same by 5, and there remayneth 2. This being done, you must finde 2 numbers, the least that is possible, which may bee diuided by 5, and by 2, in such sort, that ý number which is diuided by 2, may exceede the other that is diuided by 5, onely by 1, and those 2 numbers are 10 & 6, for if you diuide 6 by 2, your quotient will be 3, and 10 diuided by 5, bringeth but 2: then consider that 6 contayneth 3 times 2, and therefore you muste multiplie 12 by 3, and they make 36, from the which you must subtract 1, and there will remaine 35, which is the number

that

that is required to be found.

6 And if shee had counted them after the same manner unto 7, and that there had remayned nothing, then you knowe that 60 is the nearest number that may be divided by 2, 3, 4, 5, and 6, the which 60 being divided by 7, there will remaine 4, and therefore you must finde two numbers, the least that may be, that can bee divided by 4, and 7, in such sorte, that that number which is divided by 4, maye exceede the other, number (by 1) that is divided by 7, the which 2 numbers are 7 and 8, for if you divide 8 by 4, your quotient will be 2. And dividing 7 by 7, your quotient will be 1, and therfore for because that 8 contayneth 2 times 4, you muste multiplie 60 by 2, and ther of commeth 120, from the which number you shall subtract 1, and the residue which are 119, is the number that is required.

7 A theefe entring into a Garden, did steale from thence a certaine number

ber of Apples: And at his comming forth, he did meete with 3 men, one after another, who threatned to accuse him: and for to appease them, he gaue vnto the first, the $\frac{1}{2}$ of all his Apples, who receyued the same with thankes, but hee returned him 12 of them backe againe. Then he gaue vnto the second ye $\frac{1}{2}$ of them that he had remaining, who receyued the same, but hee gaue him backe againe 7 Apples, and so he gaue vnto the thirde man the $\frac{1}{2}$ of the residue, who returned him foure. And in the ende he had still remayning 20 Apples. The question is to knowe howe many Apples hee gathered in the sayde Garden? Answere: for to doe this you shall

A rule.

substract 4 from 20, and there will remaine 16, the same you shall double, & they make 32, from the which you must abate 7, and there will remaine 25, the same you shall double, and they make 50: from the which you shall substract 12, and there will remaine 38: whereof the double which is 76 doeth shewe the number of Apples that hee gathe-

red

red. This and such like questions are easie to be done in going backwardes from the ende of the question, vntill you come to the beginning thereof. But if he had giuen the $\frac{2}{3}$ vnto one of them, the $\frac{1}{2}$ vnto another, and the $\frac{1}{4}$ vnto ẏ last or any other; all the same maye bee done by the conuerse rule, that is to say, beginning at the ende of the question, til you come to the beginning, as before is sayd.

8. A Marchant did ride vnto three seuerall Faires, at the first hee doubled his monie, and spent ten Crownes, at the second faire hee did also double his money and spent ten Crownes: and likewise at the third faire he did double his money and spent ten crownes: and in the end he found that hee had remayning but 2 Crownes. The question is to know how many Crownes he had at the first? Answere, For to doe this, you must adde vnto ten Crownes the two Crownes which hee hadde remayning, and they make 12, whereof you shall

take the $\frac{1}{2}$ which is 6: againe, adde 6 vnto 10, and they make 16, whereof you shall take the $\frac{1}{2}$ which is 8: finallye you shall adde 8 vnto 10, and they make 18, whereof you must take the $\frac{1}{2}$ which is 9: and so he had 9 crownes at the first.

9 A Burgeois woulde distribute a certaine summe of pence vnto diuers poore men equally, but after that hee had counted how manye they were in number, he perceiued that if he shoulde giue vnto euery man 6 pence, he should want 14 pence, but if he shoulde giue euery man 5 pence the peece, he shoulde haue 9 pence remaining, the question is to knowe the numbers of the poore men? Answere, for to doe this and such like Questions, you must haue in remembrance this principle, more from more, or lesse from lesse, &c. Whiche is sette foorth in 2 verses in the Rule of false positions, that is to say, you must adde the lesse with the more. Namelye 14 with 9, and they make 23: and de-

uide

uide the same summe by the difference which is of 5 from 6, that is 1. And therefore you must diuide 23 by 1, but 1 doeth neither multiplie nor diuide, therefore you may conclude & say, that there were 23 poore men.

10. And if he should giue to euerye man 5 pence, he should haue 19 pence remaining, and giuing euery man 7 d. he should haue 3 d. ouer: In this case you must abate more from more, that is to say 3 from 19, and the rest which is 16 you must diuide by 2, which is the difference of 5 from 7: and the quotient which is 8, doth shew you the number of the poore men, and likewise that if he had had both wants, that is, if both the numbers had bene too little, you must haue done with them, as you did with the others that were both more.

11 A manne hath giuen vnto 20 workefolke 20 shil. that is to saye, vnto men, women, and boyes: vnto men

hee gaue 20 pence a peece, vnto women 15 pence, and vnto boyes he gaue 8 pence. The question is to know how many men, howe many women, and howe manye boies there were in all? Answere, First you must take the difference of 8 from 15, & also from 20: & you shall haue 7 for the difference of the women, and 12 for that of the men: this done, you may suppose that there were 20 boies, the whiche at 8 pence the peece maketh 160: the which you must abate from 20 shillings, being reduced into pence, that is, from 240 d. and there will remaine 80 pence, the which 80 you shall diuide into 2 suche parts that the one may be diuided by 7, and the other by 12, and that nothing maye remaine after the diuisions are made, the which 2 numbers are 56, and 24, for 56 being diuided by 7, bringeth into the quotient 8, and 24 beeing diuided by 12, will bring into the quotient 2, which sheweth that there was 8 women, and 2 men, and the rest of the 20 which are 10, were boies, so there

were 8 women, two men, and 10 boies, Some men doe call this rule the Uir-gins rule.

The ſixt Chapter treateth of ſports and Paſtimes, done by number.

If you would know yͤ number that anye manne doth thinke oꝛ imagine in his mind, as though you coulde diuine.

Bid him triple the ſame number, then of the pꝛoduct let him take the $\frac{1}{2}$, if the number be euen, oꝛ elſe the greater half if the ſame be odde, then bid him triple againe the ſayd $\frac{1}{2}$: after ſay to him that he ſhall put away if he can 36, 27, oꝛ 9, from the laſt number beeing tripled: that is to ſaye, cauſe him ſubtillye to put awaye 9 as many times as is poſſible, and keepe the number ſecretlye: and when hee can no moꝛe take away 9: then to know if that yet there remaine any number bid him abate 3,

2 or 1, if he can, this done see how many times 9 you haue caused him to abate, for the which keepe you in mind so many times 2, and if that you knowe that he had any thing remaining besides the nines, ẏ same shal also note vnto you 1.

Example.

Suppose that hee oughte 6; which being tripled is 18, whereof the ½ is 9, the triple of that is 27: now cause him to abate 18 or 9, or 27: and againe 9, but then he will saye vnto you that hee cannot, bid him now abate 3, or 2, or 1, he wil say also that he cannot, wherfore considering that you haue made him to abate three times 9 iustly, you shall tell him that he thought 6, for 3 times 2 maketh 6. If hee had thought 5, the triple thereof is 15, whereof the greater ½ is 8, the triple of that maketh 24, which containeth two times 9, they are worth 4, and the remaine signifyeth 1, the which added together, make 5, which is the number that he thought

2.

Baker. H.

2. If in any companye, one of them hath a Ring vpon his finger, and you woulde knowe by manner of diuining, who hath the same, and vpon what finger and what ioint, cause the persons to sit down in order, and keepe likewise an order of their fingers, then separate your selfe from them in some certayne place, and say vnto one of the lookers on, that hee double the number (marking well in your minde the order) of him the which hath the ring: and vnto the double bidde him adde 5, and then cause him to multiplye this addition by 5, and vnto the producte bidde him adde the number of the finger of the person which hath the Ring. Suppose that the same last summe did amount vnto 89, then afterwards say to him that he put after the same last number towardes his right hand a figure signifieng vppon which of the ioyntes hee hath the Ring, as if it bee vpon the third ioynt, let him put 3 after 89, and it will be 893, this done you shall aske

him what number he keepeth, from the which you shall abate 250, and you shal haue three figures remayning at the least. The first towards your left hande shall signifie the number of the person which hath the Ring. The seconde or middle figner shall represent the number of the figure. And the last figure towards your righte hande shall betoken the number of the ioynt, as if the number which he did keepe were 883 from that you shall abate 250, & there will remaine 633, which doe note vnto you that the sixt person hath the Ring vpon the third finger, and vpon his third ioynt.

But note that when you haue made your substraction, if there doe remayne a cipher in the place of tens, you must abate 1 from that figure which is in the place of hundreds, that is to saye, from the figure which is next your left hand, and that shall bee worth 10 tenths, signifieng the tenth finger: as if there shoulde remaine 603, you must saye

that

that the firt person (vpon his tenth finger, and his third ioint) hath the ring.

3. And after the same maner, if a man doe cast three dice, you may knowe the pointes of euery one of them, for if you doe cause him to double the poynts of one die, and vnto the double to adde 5, and the same summe to multiplye by 5, & vnto the product adde the points of one of the other dice, and behind the number towards the right hand to put the figure which signifieth the points of the last die, and then shall you aske him what number he keepeth, from ẏ which abate 250, and there will remaine 3 figures, which doe note vnto you ẏ points of euery die.

4. Likewise, if 3 of your companions to say, Peter, James, and John, would (in your absence) giue themselues euery one a contrary name: as for Example: Peter woulde bee called a King, James a Duke, and John a Countie, and you would diuine whiche of them is called a King, whiche the

Duke

Duke, and which the Countie. Take 24 stones, or other peeces whatsoeuer, and giue vnto Peter 1, vnto James 2, and vnto John 3, or otherwise. But marke well vnto which of them you haue giuen 1, vnto which 2, and vnto whome 3. Then leauing eighteene stones (before them) that are remayning, you shall absent your selfe from their sight, or else turne your face from them, saieng thus vnto them, whosoeuer nameth himselfe a king, for euery stone that I gaue him let him take one of the residue; and he that nameth himselfe a Duke, for euery stone that I gaue him let him take 2 of them that remaine, and he that calleth himselfe a Countie, for euery stone that I gaue him, let him take 4: this beeing done, approch neare them, and marke how many stones are remayning, and know this, that there cannot remaine anye other number but one of these six, 1, 2, 3, 5, 6, 7, for the which sixe numbers wee haue chosen to euery one of them a seuerall name which are these: Angeli

Beati,

Beati, Taliter, Messias, Israell, Pietas: eche of them contain ing three vowels, a, e, i, which doe shewe the names by order: that is to saye, the vowell a, sheweth whiche is the King, the vowell e, telleth whiche is the Duke, and the vowell i, sheweth which is the Countie: in following the order

1	2	1	2	3	3
2	1	3	3	1	2
3	3	2	1	2	1
a	e	a	e	i	i
e	a	i	i	a	e
i	i	e	a	e	a
1	2	3	5	6	7
A	B	T	M	I	P

how, and to whome you haue giuen one stone, to whom 2, & to which 3, then if there do remaine but one stone, the first Angeli (by these three vowels a, e, i,) sheweth that Peter is the king, James the Duke, and John the Countie. And if there do remaine 2 stones, the second name Beati shall shewe you by these 3 vowels e, a, i, that Peter is the Duke, James the king, & John the Countie. And so of the other, as by this Table doth plainly appeare.

FINIS.

¶The agreement of the measures and waights of diuers Countries the one with the other, being reduced to an equalitie, and drawne into Tables, as followeth.

London,

100 elles at London doe make at

Andwerp,	166 $\frac{2}{3}$
Nuremberg,	174 $\frac{1}{9}$
Francf. Liebzig, & Preslaw,	208 $\frac{1}{3}$
Dantzick,	138 $\frac{1}{3}$
Vienne in Austri.	145
Lions in Fraunce,	101 $\frac{2}{3}$
Parris in Fraunce,	095
Rouan in Normandie,	16 $\frac{2}{3}$
Lishborne,	100 vares.
Siuil and other places in Spai.	135
The Isles of Madere,	103 $\frac{1}{3}$.
Venice,	180 braces
Florence,	204 $\frac{1}{6}$ braces.
Millan,	230
Geanes,	480 $\frac{5}{8}$ paul.

The like agreement hath 225 yards vnto the measures aforesaid.

The agreement of the measure at Andwerp with the measures at other places.

Andwerpe.

100 elles at Andwerpe do make at

London, yards 75, & 60 elles.
Nuremberg, 104 ½
Frankford, 125.
Dantzick, 83.
Vienne in Austrice, 87.
Lyons, 60 aulnes.
Parris, 57
Rouan, 42
Lishburne, 60 vares.
Siuill, &c. 81
The Isles, &c. 62
Venice, 108 braces.
Lucques, 120
Florence, 122 ½.
Millan, 138.
Geanes 288 ½ paulmes.

The agreement of the measure at Nuremberg, with the measure at other places.

Nuremberg.

100 elles at Nurẽberg doe make at	London	$57\frac{2}{5}$ elles.
	Andwerpe	$95\frac{3}{5}$.
	Frankford	$119\frac{3}{5}$.
	Dantzig	$79\frac{1}{2}$.
	Vienne, &c.	$83\frac{1}{4}$.
	Lions	$58\frac{1}{3}$ aulnes.
	Parris	$54\frac{1}{2}$
	Rouan	$49\frac{3}{4}$
	Lishburne	$57\frac{2}{5}$ vares.
	Siuill &c.	$72\frac{1}{2}$
	The Isles, &c.	$58\frac{1}{3}$
	Venice	$103\frac{1}{5}$ braces
	Lucques	$114\frac{4}{5}$
	Florence	$117\frac{1}{5}$
	Millan	132
	Geanes.	276 paulmes

The agreement of the measure at Frankford with the measures at other places.

Frankford.

100 elles at Frankeford, doe make at

London, 84 elles.
Andwerpe 80
Nuremberg, 83 $\frac{3}{5}$.
Dantzick, 66 $\frac{2}{5}$.
Vienne in Austrice, 69 $\frac{3}{5}$.
Lyons, 58 $\frac{4}{5}$. aulnes.
Parris, 45 $\frac{3}{5}$
Rouan, 41 $\frac{3}{5}$
Lishburne, 48 vares.
Siuill, &c. 64 $\frac{4}{5}$.
The Isles, &c. 49 $\frac{3}{5}$.
Venice, 86 $\frac{2}{5}$ braces.
Lucques, 96.
Florence, 98.
Millan, 110 $\frac{2}{5}$.
Geanes 239 $\frac{4}{5}$ paulines.

The agreement of the measure at Dantzik, with the measure at other places.

		Dantzik.	
100 elles at Dantzick doe make at	London	72 ¾	elles.
	Andwerpe	120 ½.	
	Nuremberg,	125 ⅞.	
	Frankford	150 ⅝.	
	Vienne, &c.	107 ½.	
	Lions	73 ½	aulnes.
	Parris	68 ⅝	
	Rouan	62 ⅝	
	Lishburne	72 ¾	vares.
	Siuill &c.	27 ½	
	The Isles, &c.	74 ⅝	
	Venice	130	braces
	Lucques	144 ½	
	Florence	137 ½	
	Millan	166 ¼	
	Geanes.	347 ½	paulmes

The agreement of the measure at Vienne, wi h the measures at other places.

Vienne in Austrice.

100 elles at Vienne do make at

London	68 $\frac{9}{10}$ elles.
Andwerp,	114 $\frac{6}{10}$
Nuremberg,	120
Francf. Liebzig, & Preslaw,	143 $\frac{1}{2}$
Dantzick,	95 $\frac{1}{8}$
Lions in Fraunce,	70 $\frac{1}{10}$
Parris in Fraunce,	65 $\frac{1}{2}$
Rouan in Normandie,	59 $\frac{3}{4}$
Lishborne,	68 $\frac{9}{10}$ vares
Siuil and other places in Spa.	93 $\frac{8}{10}$
The Isles of Madere,	71 $\frac{1}{4}$.
Venice	124 $\frac{5}{8}$ braces
Florence,	140 $\frac{4}{5}$ braces.
Millan	158 $\frac{3}{5}$
Geanes,	331 $\frac{3}{5}$ paul.

The agreement of the measures at Lions with the measures at other places.

Lions.

100 aulnes at Lions do make at	London	98 $\frac{1}{3}$ elles.
	Andwerpe	163 $\frac{7}{8}$
	Nuremberg, &c.	171 $\frac{1}{4}$
	Franckford	204 $\frac{5}{6}$
	Dantzicke	136
	Vienne	142 $\frac{1}{2}$
	Parris	93 $\frac{2}{5}$ aulnes.
	Rouan	85 $\frac{1}{4}$
	Lishborne	98 $\frac{1}{3}$ vares.
	Siuill	132 $\frac{3}{4}$
	The Isles, &c.	101 $\frac{3}{5}$
	Venice	177 braces.
	Lucques	196 $\frac{2}{3}$
	Florence	200 $\frac{3}{4}$
	Millan	226 $\frac{1}{5}$
	Geanes.	472 $\frac{7}{8}$. paulins.

The agreement of the measure at Paris, wi h the measures at other places.

Paris in Fraunce.

100 aulns at Paris maketh at

London	$105\frac{1}{4}$ elles.
Andwerp,	$175\frac{2}{5}$
Nurenberg,	$183\frac{1}{3}$
Franck. Liebzig, & Preslaw;	$219\frac{4}{5}$
Dantzick,	$145\frac{3}{5}$
Vienne	$152\frac{2}{5}$
Lions in Fraunce,	107 aulnes.
Rouan in Normandie,	$91\frac{1}{5}$
Lishborne,	$105\frac{1}{4}$ vares
Siuil and other places in Spa.	142
The Isles of Madere,	$180\frac{3}{4}$.
Venice	$189\frac{2}{5}$ braces
Florence;	$214\frac{7}{8}$ braces;
Millan	242
Geanes;	$506\frac{1}{8}$ pauls.

The agreement of the measures at Rouan with the measures at other places.

Rouan.

100 aulnes at Rouan do make at

London	115 5/8	elles.
Andwerpe	192 1/4	
Nuremberg, &c.	200 7/8	
Franckford	240 3/8	
Dantzicke	159 3/5	
Vienne	167 1/4	
Lions	117 1/4	aulnes.
Parris	109 3/5	
Lishborne	115 1/8	vares.
Siuill	155 3/4	
The Isles, &c.	119 1/5	
Venice	207 2/5	braces,
Lucques	230 3/4	
Florence	235 1/2	
Millan	265 3/8	
Geanes.	554 4/10	

The agreement of the measure at Lishborne with the measures at other places.

Lishborne.

100 vares at Lishborne doe make at	London	100 elles
	Andwerpe	166 $\frac{2}{3}$
	Nuremberg	174 $\frac{1}{6}$
	Franckford, &c.	208 $\frac{1}{3}$
	Dantzicke	131 $\frac{1}{3}$
	Vienne	145
	Lions	101 $\frac{2}{3}$ aulnes.
	Parris	95
	Rouan	86 $\frac{2}{3}$
	Siuill, &c.	135 vares.
	The Isles, &c.	103 $\frac{1}{3}$
	Venice	180 braces.
	Lucques	200
	Florence	204 $\frac{1}{6}$
	Millan	230
	Geanes.	480 $\frac{5}{6}$

¶ The agreement of the measure at Siuil with the measures at other places.

Siuil:

100 vares at Siuill doe make at

London	74 elles.
Andwerp	127 $\frac{7}{10}$
Nuremberg	129
Franckford, &c.	245 $\frac{5}{18}$
Dantzig	102 $\frac{7}{16}$
Vienne, &c.	107 $\frac{3}{8}$
Lions	57 $\frac{1}{4}$ aulnes.
Parris	70 $\frac{3}{8}$
Rouan	64 $\frac{1}{8}$
Lishborne	74 vares.
The Isles, &c.	76 $\frac{1}{2}$
Venice	133 $\frac{1}{3}$ braces.
Lucques	148 $\frac{1}{8}$
Florence	151 $\frac{3}{16}$
Millan	170 $\frac{3}{8}$
Geanes.	356 $\frac{1}{4}$ paulms

The agreement of the measure at the Isles, &c. with the measures at other places.

The Isles of Madere.

100 vares at ÿ Isles maketh at	London	96 3/4 elles
	Andwerpe	161 1/4
	Nuremberg	168 1/4
	Franckford, &c.	201 1/2
	Dantzicke	133 5/6
	Vienne	140 1/3
	Lions	98 1/3 aulnes.
	Parris	91 7/8
	Rouan	83 5/6
	Lishborne	96 3/4 vares
	Siuill, &c.	130 3/5
	Venice	574 1/5 braces.
	Lucques	193 1/2
	Florence	197 1/2
	Millan	222 1/2
	Geanes.	465 1/4

The agreement of the measure at Venice with the measures at other places.

Venice.

100 braces at Venice doe make at

London	$55\frac{1}{2}$ elles.
Andwerp	$92\frac{1}{2}$
Nuremberg	$96\frac{1}{4}$
Franckford, &c.	$115\frac{1}{4}$
Dantzig	$76\frac{4}{5}$
Vienne, &c.	$80\frac{1}{2}$
Lions	$56\frac{1}{2}$ aulnes.
Parris	$52\frac{1}{4}$
Rouan	$48\frac{1}{8}$
Lishborne	$55\frac{1}{2}$ vares.
Siuill, &c.	75
The Isles, &c.	$57\frac{2}{5}$
Lucques	111 braces.
Florence	$113\frac{2}{5}$
Millan	$127\frac{3}{4}$
Geanes.	$367\frac{1}{8}$ paulms

The agreement of the measure at Lucques with the measures at other places.

Lucques.

100 brac. at *Luc*ques doe make at

London, 50 elles.
Andwerpe, 83 $\frac{1}{3}$
Nurenberg, 76
Frankford, 104 $\frac{1}{6}$
Dantzick, 69 $\frac{1}{6}$
Vienne in Austrice, 72 $\frac{1}{2}$
Lyons, 50 $\frac{5}{6}$ aulnes.
Parris, 47 $\frac{1}{2}$
Rouan, 43 $\frac{1}{3}$
Lishburne, 50 vares.
Siuill, &c. 67 $\frac{1}{2}$
The Isles, &c. 51 $\frac{2}{3}$
Venice, 90 braces.
Florence, 102
Millan, 115.
Geanes 240 $\frac{1}{3}$ paulmes.

The agreement of the measure at Florence, with the measure at other places.

Florence.

100 brac. at Florēce make at	London	49	elles.
	Andwerpe	81 $\frac{3}{8}$.	
	Nuremberg.	85 $\frac{1}{4}$.	
	Frankford	201 $\frac{1}{2}$.	
	Dantzik	133 $\frac{5}{6}$	
	Vienne, &c.	71	
	Lions	49 $\frac{3}{4}$	aulnes.
	Parris	46 $\frac{1}{2}$	
	Rouan	42 $\frac{2}{5}$	
	Lishburne	49	vares.
	Siuill &c.	42 $\frac{2}{5}$	
	The Iles, &c.	50 $\frac{3}{5}$	
	Venice	88 $\frac{1}{6}$	braces
	Lucques	97 $\frac{7}{8}$	
	Millan	112 $\frac{3}{5}$	
	Geanes	235 $\frac{1}{5}$	

The agreement of the measure at Millan with the measures at other places.

Millan.

100 brac. at Millan doe make at

- London, 43 $\frac{2}{5}$ elles.
- Andwerpe, 72 $\frac{2}{5}$
- Nuremberg, 75 $\frac{7}{8}$
- Frankford, 90 $\frac{1}{2}$
- Dantzick, 60 $\frac{1}{8}$
- Vienne in Austrice, 93
- Lyons, 44 $\frac{1}{3}$ aulnes.
- Parris, 41 $\frac{1}{4}$
- Rouan, 37 $\frac{2}{3}$
- Lishburne, 43 $\frac{2}{5}$ vares.
- Sivill, &c. 58 $\frac{2}{3}$
- The Iles, &c. 44 $\frac{7}{8}$
- Venice, 78 $\frac{1}{4}$ braces.
- Lucques, 86 $\frac{7}{8}$
- Florence, 88 $\frac{3}{4}$
- Geanes 209 paulmes.

The agreement of the measure at Geanes, with the measure at other places.

Geanes.

100 pali. at Geans make at	London	20 3/4	elles.
	Andwerpe	34 3/5.	
	Nuremberg,	36 1/5.	
	Frankford	43 2/6.	
	Dantzik	28 1/4.	
	Vienne, &c.	30 1/8.	
	Lions	21 2/8	aulnes.
	Parris	91 3/4	
	Rouan	18	
	Lishburne	20 1/4	vares.
	Siuill &c.	28	
	The Isles, &c.	21 2/5	
	Venice	73 2/5	braces
	Lucques	41 1/2	
	Florence	42 3/5	
	Millan	47 5/6	

¶ The agreement of the measures and waights of diuers Countries the one with the other, being reduced to an equallitie, and drawne into Tables, as followeth.

London.

112 li. waight at London maketh at

Andwerpe	107 $\frac{1}{8}$
Franckford	99
Collen & Ausberge,	102 $\frac{1}{4}$
Nuremberg	100 $\frac{1}{8}$
Rouan	98
Lions	118 $\frac{1}{2}$
Parris	102 $\frac{1}{4}$
Diepe	100 $\frac{1}{4}$
Geneua	90 $\frac{3}{8}$
Tolouse	122 $\frac{1}{4}$
Rochell	124 $\frac{7}{8}$
Marcellis	124 $\frac{1}{4}$
Siuill, &c.	109 $\frac{1}{4}$
Venice suttle waig.	166 $\frac{7}{8}$
Venice grosse waig.	105 $\frac{3}{8}$
Aquilla	157 $\frac{1}{4}$
Vienne	89 $\frac{1}{8}$
Preslaw	134 $\frac{7}{8}$
Liebzig	101 $\frac{1}{4}$
Dantzig	129 $\frac{1}{4}$
Lubeck	97 $\frac{1}{8}$
Barcellon	143 $\frac{1}{2}$
Lishborne	99
Geanes.	157 $\frac{1}{4}$

The agreement of the waightsat Andwerpe, with the waight at other places.

Andwerpe:

100 li. waight at Andwerp maketh at

London	104 r
Frankford	91 $\frac{7}{8}$
Collen, &c.	94 $\frac{7}{8}$
Nureinberg	93
Rouan	91
Lions	100
Parris	96 $\frac{1}{4}$
Diepe	93
Geneua	84
Tolouse	114
Rochell	116
Marseillis	115 $\frac{1}{4}$
Siuill	101 $\frac{7}{8}$
Venice, &c.	155
Venice &c.	97 $\frac{3}{4}$
Aquila	146
Vienne	83
Preslaw	125
Liebzig	94
Dantzig	120
Lubeck	90 $\frac{3}{4}$
Barcellone	133 $\frac{1}{4}$
Lishborne	85 $\frac{1}{2}$
Geanes.	146

The agreement of the waight at Frankford, with the waight at other places.

Frankford.

112 li. waight at Frankford maketh at	London	113 1/3
	Andwerpe	108 3/4
	Collen & Ausberge,	103 1/4
	Nuremberg	102 1/8
	Rouan	99
	Lions	119 5/8
	Parris	103 1/4
	Diepe	101 1/4
	Geneua	91 1/4
	Tolouse	124
	Rochell	126 1/8
	Marcellis	125 1/2
	Siuill, &c.	110 3/4
	Venice suttle waig.	168 1/2
	Venice grosse waig.	106 3/8
	Aquilla	158 3/4
	Vienne	90 1/4
	Preslaw	135 7/8
	Liebzig	102 1/4
	Dantzig	130 1/2
	Lubeck	98 1/4
	Barcellon	144 7/8
	Lisbon	100
	Geanes.	158 5/8

The agreement of the waights at Collen and Ausberge, with the waight at other places.

Collen and Ausberge.

100 li. waight at Collen & Ausberge maketh at	London	109 $\frac{1}{2}$
	Andwerpe	105 $\frac{1}{4}$
	Frankford	96 $\frac{3}{4}$
	Nuremberg	97 $\frac{7}{8}$
	Rouan	95 $\frac{3}{4}$
	Lions	115 $\frac{7}{8}$
	Parris	100
	Diepe	98
	Geneua	88 $\frac{1}{2}$
	Tolouse	120
	Rochell	122 $\frac{1}{8}$
	Marseillis	121 $\frac{1}{2}$
	Siuill	170 $\frac{1}{2}$
	Venice, &c.	163 $\frac{1}{8}$
	Venice &c.	103
	Aquila	153 $\frac{3}{4}$
	Vienne	87 $\frac{1}{4}$
	Preslaw	101
	Liebzig	99
	Dantzig	126 $\frac{3}{8}$
	Lubeck	95 $\frac{1}{4}$
	Barcellone	140 $\frac{1}{4}$
	Lishborne	96 $\frac{3}{4}$
	Geanes.	153 $\frac{3}{4}$

The agreement of the waight at Nuremberg with the waightes at other places.

		Nuremberg.
100 li. waight at Nuremb. maketh at	London	111 3/4
	Andwerpe	107 1/2
	Franckford	98 7/8
	Collen, &c.	102
	Rouan	97 7/8
	Lions	118 1/4
	Parris	102
	Diepe	100 1/8
	Geneua	90 1/4
	Toulouse	122 3/8
	Rochell	124 5/8
	Marseilles	124
	Siuill	109 1/2
	Venice, &c.	166 5/8
	Venice, &c.	105 1/8
	Aquila	157
	Vienne	89 3/4
	Preslaw	134 3/8
	Liebzig	101 1/8
	Dantzicke	129
	Lubecke	97 3/4
	Barcellone	143 1/4
	Lishborne	98 7/8
	Geanes.	157

¶ The agreement of the waight at Rouan with the waights at other places.

100 li. waight at Rouan do make at		Rouan.
	London	114 1/2
	Andwerp	109 7/8
	Franckford	101
	Collen	104 1/4
	Nuremberg	102 1/8
	Lions	120 7/8
	Parris	104 1/4
	Diepe	102 1/4
	Geneua	92 1/4
	Toulouse	125 1/4
	Rochell	127 1/4
	Marsellis	126 3/4
	Siuil, &c.	112
	Venice, &c.	170 1/2
	Venice, &c.	107 1/2
	Aquila	106 1/2
	Vienne	91
	Preslaw	137 1/4
	Liebzig	103 1/4
	Dantzig	131 7/8
	Lubeck	99 1/2
	Barcellon	146 1/4
	Lishborne	101
	Geanes.	160 1/2

The agreement of the waight at Lyons with the waightes at other places.

100 li. waight at Lions maketh at

	Lions.
London	$94\frac{1}{2}$
Andwerpe	$90\frac{2}{3}$
Franckford	$83\frac{1}{2}$
Collen, &c.	$86\frac{1}{4}$
Nuremberg	$84\frac{1}{8}$
Rouan	$82\frac{1}{2}$
Parris	$86\frac{1}{4}$
Diepe	$84\frac{1}{8}$
Geneua	$76\frac{1}{4}$
Toulouse	$103\frac{1}{2}$
Rochell	$105\frac{1}{4}$
Marseilles	$104\frac{1}{4}$
Siuill	$92\frac{1}{2}$
Venice, &c.	$140\frac{1}{4}$
Venice, &c.	$88\frac{1}{8}$
Aquila	$132\frac{1}{2}$
Vienne	$75\frac{1}{4}$
Preslaw	$113\frac{1}{2}$
Liebzig	$85\frac{1}{4}$
Dantzicke	109
Lubecke	82
Barcellone	121
Lishborne	$83\frac{1}{2}$
Geanes.	$122\frac{1}{2}$

The agreement of the waight at Aquila with the waights at other places.

100 li. waight at Aquila do make at

	Aquila.
London	71 1/4
Andwerp	68 4/5
Franckford	62 7/8
Collen	65
Nuremberg	63 5/8
Rouan	62 1/4
Lions	75 1/4
Parris	65
Diepe	63 1/8
Geneua	57 3/8
Toulouse	78
Rochell	79 3/8
Marsellis	79
Siuill, &c.	69 3/4
Uenice, &c.	106
Uenice, &c.	67
Uienne	56 3/4
Preslaw	85 3/4
Liebzig	64 1/4
Dantzig	82 1/8
Lubeck	91 1/4
Barcellon	91 1/6
Lishborne	62 7/8
Geanes.	100

The agreement of the waighte at Diepe, with the waightes at other places.

Diepe.

100 li. waighte at Diepe maketh at

London	111 1/2
Andwerp,	197 1/4
Francford, &c.	98 3/4
Collen, &c.	102
Nuremberg,	97 7/8
Rouan	97 3/4
Lions	118 1/8
Paris	102
Geneue	90 1/8
Toulouse	122 3/8
Rochell	124 1/2
Marseilles	123 7/8
Siuil, &c.	109 3/8
Venice, &c.	166 3/8
Venice, &c.	105
Aquila	156 3/4
Vienne	89 1/8
Preslaw	134 1/4
Liebzig	101
Dantzick	128 3/4
Lubec	97 3/8
Barcellone	143 5/8
Lishborne,	98 3/4
Geanes,	156 3/4

The agreement of the waights at Geneua, with the waights at other places.

Geneua.

100 li. waight at Geneua make at

London	123 $\frac{1}{4}$
Andwerp	119 $\frac{1}{8}$
Franckford, &c.	109 $\frac{1}{2}$
Collen, &c.	113 $\frac{1}{8}$
Nuremberg.	110 $\frac{3}{4}$
Rouan	108 $\frac{1}{2}$
Lions	131 $\frac{7}{8}$
Parris	118 $\frac{1}{8}$
Diepe	98
Tolouse	135 $\frac{1}{4}$
Rochel	138 $\frac{1}{8}$
Marcellis	137 $\frac{3}{4}$
Siuill, &c.	121 $\frac{3}{8}$
Venice	116 $\frac{1}{2}$
Venice, &c.	184 $\frac{1}{2}$
Aquila	174
Vienne	98 $\frac{7}{8}$
Preslaw	148 $\frac{7}{8}$
Liebzig	112
Dantzicke	143
Lubec	107 $\frac{1}{2}$
Barcellon	158 $\frac{1}{4}$
Lishborne	109 $\frac{1}{2}$
Geanes.	174

The agreement of the waightes at Tolouse, with the waights at other places.

Toulouse.

100 li. waight at Toulouse maketh at

London	91 1/4
Andwerp,	87 1/2
Francford, &c.	80 5/8
Collen, &c.	83 1/4
Nuremberg,	81 7/8
Rouan	79 3/4
Lions	96 1/2
Paris	83 1/4
Diepe	81 1/2
Geneue	73 5/8
Rochell	101 1/2
Marseilles	101 1/8
Siuil, &c.	89 3/8
Venice, &c.	135 7/8
Venice, &c.	81 5/8
Aquila	128
Vienne	72 1/4
Preslaw	109 5/6
Liebzig	82 3/8
Dantzick	105 1/4
Lubec	79 1/4
Barceilone	116 7/8
Lishborne,	80 5/8
Geanes,	126 1/4

The agreement of the waights at Rochel, with the waightes at other places.

Rochel.

100 li. waight at Rochel do make at

London	89 5/8
Andwerpe	86 1/8
Franckford, &c.	79 1/4
Collen, &c.	81 1/8
Nuremberg,	80 1/4
Rouan	87 1/4
Lions	94 7/8
Parris	81 7/8
Diepe	80 1/4
Geneue	72 1/4
Tolouse	98 1/4
Marcellis	99 1/2
Siuill, &c	87 7/8
Uenice	133 5/8
Uenice, &c.	48 3/8
Aquila	125 7/8
Uienne	71 1/2
Preslaw	107 3/4
Liebzig	81 1/4
Dantzicke	103 1/3
Lubec	77 7/8
Barcellon	144 7/8
Lishborne	97 1/4
Geanes.	125 7/8

The agreement of the waight at Marcellis, with the waight at other places.

100 li. waight at Marcellis maketh at

	Marcellis.
London	88 $\frac{1}{2}$
Andwerpe	86 $\frac{1}{2}$
Frankford, &c.	79 $\frac{1}{2}$
Collen & Ausberge,	82 $\frac{1}{4}$
Nuremberg	80 $\frac{1}{2}$
Rouan	78 $\frac{7}{8}$
Lions	59 $\frac{1}{4}$
Parris	82 $\frac{1}{4}$
Diepe	80 $\frac{5}{8}$
Geneua	72 $\frac{1}{2}$
Tolouse	98 $\frac{3}{4}$
Rochell	100 $\frac{1}{2}$
Siuill, &c.	88 $\frac{1}{4}$
Uenice suttle waig.	134 $\frac{1}{4}$
Uenice grosse waig.	84 $\frac{1}{4}$
Aquilla	126 $\frac{1}{2}$
Uienne	71 $\frac{7}{8}$
Preslaw	108 $\frac{1}{4}$
Liebzig	81 $\frac{3}{8}$
Dantzig	104
Lubeck	78 $\frac{1}{8}$
Barcellon	115
Lishborn	79 $\frac{5}{8}$
Geanes.	126 $\frac{1}{8}$

The agreement of the suttle waight at Venice, with the waights at other places.

Venice suttle waight:

100 li. waight at Venice maketh at

London	67
Andwerpe	64 $\frac{1}{2}$
Frankford	59 $\frac{1}{4}$
Collen, &c.	61 $\frac{1}{4}$
Nurenberg	60
Rouan	58 $\frac{5}{8}$
Lions	71
Parris	61 $\frac{1}{4}$
Diepe	60
Geneua	54 $\frac{1}{8}$
Tolouse	73 $\frac{1}{4}$
Rochell	74 $\frac{1}{4}$
Marseillis	74 $\frac{1}{8}$
Siuill	65 $\frac{3}{4}$
Venice &c.	63 $\frac{1}{8}$
Aquila	94 $\frac{1}{8}$
Vienne	53 $\frac{1}{2}$
Preslaw	80 $\frac{3}{4}$
Liebzig	60 $\frac{5}{8}$
Dantzig	77 $\frac{3}{8}$
Lubeck	58 $\frac{1}{4}$
Barcellone	86
Lishborne	59 $\frac{1}{4}$
Geanes.	94 $\frac{1}{8}$

The agreement of the waight at Siuill, with the waight at other places.

100 li. waight at Siuill maketh at

	Siuill.
London	102
Andwerpe	98 1/2
Frankford, &c.	79 5/8
Collen & Ausberge,	93 1/8
Nuremberg	91 1/8
Rouan	89 1/4
Lions	107 7/8
Parris	93 1/8
Diepe	91 1/4
Geneua	82 1/4
Tolouse	111 3/4
Rochell	113 3/4
Marcellis	113 1/4
Venice suttle waig.	152
Venice grosse waig.	96
Aquilla	143 1/4
Vienne	81 5/8
Preslaw	122 5/8
Liebzig	92 1/4
Dantzig	117 1/4
Lubeck	88 5/8
Barcellon	130 3/4
Lishborn	90 1/8
Geanes,	143 1/4

The agreement of the grosse waight at Venice, with the waights at other places.

100 li. grosse waight at Venice maketh at	Place	Venice grosse waight.
	London	196 $\frac{1}{4}$
	Andwerpe	102 $\frac{1}{8}$
	Frankford	93 $\frac{7}{8}$
	Collen, &c.	97
	Nuremberg	95
	Rouan	93
	Lions	112 $\frac{3}{8}$
	Parris	97
	Diepe	95 $\frac{1}{8}$
	Geneua	85 $\frac{3}{4}$
	Tolouse	116 $\frac{3}{8}$
	Rochell	118 $\frac{1}{2}$
	Marseillis	117 $\frac{7}{8}$
	Siuill	104 $\frac{1}{8}$
	Venice &c.	158 $\frac{3}{4}$
	Aquila	149 $\frac{5}{8}$
	Vienne	84 $\frac{3}{4}$
	Preslaw	127 $\frac{3}{4}$
	Liebzig	96
	Dantzig	132 $\frac{5}{8}$
	Lubeck	97 $\frac{3}{8}$
	Barcellone	136 $\frac{1}{8}$
	Lishborne	92 $\frac{7}{8}$
	Geanes.	149 $\frac{1}{8}$

The agreement of the waight at Paris with the waightes at other places.

Paris.

100 li. waight at Paris doe make at

London	$109\frac{1}{2}$
Andwerpe	$105\frac{1}{4}$
Frankford, &c,	$96\frac{3}{4}$
Collen, &c.	$102\frac{1}{4}$
Nurenberg	$97\frac{7}{8}$
Rouan	$95\frac{1}{4}$
Lyons	$155\frac{2}{7}$
Diepe	98
Geneue	$88\frac{1}{4}$
Toulouse	120
Rochell	$122\frac{1}{8}$
Marsellis	$121\frac{1}{2}$
Siuill, &c.	$107\frac{3}{4}$
Venice, &c.	164
Venice, &c.	103
Aquila	$153\frac{3}{4}$
Vienne	$87\frac{1}{4}$
Preslaw	$131\frac{1}{2}$
Liebzig	$94\frac{3}{8}$
Dantzick,	$126\frac{1}{4}$
Lubeck	$95\frac{1}{2}$
Barcellone	$140\frac{5}{8}$
Lishborne	$96\frac{1}{4}$
Geanes.	$155\frac{3}{4}$

The agreement of the waight at Vienne, with the waightes at other places.

Vienne.

100 li. waight at Vienne, make at

London	125 1/4
Andwerpe	120 [illegible]/4
Frankford	110 3/4
Collen, &c	114 3/8
Nuremberg	112
Rouan	109 5/8
Lions	132 1/2
Parris	114 2/8
Diepe	112 7/8
Geneua	101 1/8
Toulouse	137 1/4
Rochell	139 5/8
Marcellis	139
Siuill &c.	122 1/4
Uenice, &c.	186 5/8
Uenice, &c.	117 7/8
Aquila	175 7/8
Preslaw	150 5/8
Liebzig	113 5/8
Dantzik	144 1/2
Lubeck	108 7/8
Barcellone	160 1/2
Lishburne	110 3/4
Geanes	175 7/8

The agreement of the waight at Preslaw with the waights at other places.

1 Preslaw.

100 li. waight at Preslaw make at

London	83 1/8
Andwerpe	79 7/8
Frankford, &c.	73 1/2
Collen, &c.	75 [illegible]
Nuremberg	74 1/4
Rouan	72 3/4
Lyons	88
Paris	75 7/8
Diepe	74 3/8
Geneue	67 [illegible]
Toulouse	91 [illegible]
Rochell	92 [illegible]
Marsellis	92 [illegible]
Siuill, &c.	81 [illegible]
Venice, &c.	123 7/8
Venice, &c.	78 [illegible]
Aquila	116 [illegible]
Vienne	66 [illegible]
Lievzig	75 [illegible]
Dantzick,	96 [illegible]
Lubeck	72 [illegible]
Barcellone	106 [illegible]
Lishborne	73 1/2
Geanes.	161 1/4

The agreement of the waight at Liebzig, with the waightes at other places.

Liebzig.

100 li. waight at Liebzig make at	London	110 1/2
	Andwerpe	106 1/4
	Frankford	97 3/4
	Collen, &c	100 7/8
	Nuremberg	98 7/8
	Rouan	96 3/4
	Lions	117
	Parris	100 7/8
	Diepe	99
	Geneua	89 1/4
	Toulouse	121 3/8
	Rochell	123 1/4
	Marcellis	122 5/8
	Siuill &c.	108 3/8
	Venice, &c.	164 3/4
	Venice, &c.	104
	Aquila	155 1/4
	Vienne, &c.	88 1/4
	Preslaw	73 2 7/8
	Dantzik	128 1/8
	Lubeck	96 1/8
	Barcellone	141 5/8
	Lishburne	97 3/4
	Geanes	155 1/4

The agreement of the waighte at Dantzicke, with the waights at other places.

100 li. waight at Dantzick do make at		Dantzike.
	London	86 1/8
	Andwerp,	83 1/4
	Francford,	76 1/2
	Collen, &c.	7[illegible]
	Nuremberg,	77 3/4
	Rouan	75 3/4
	Lions	91 5/8
	Paris	79
	Diepe	77 1/2
	Geneue	69 7/8
	Toulous.	94 7/8
	Rochell	96 1/2
	Marseilles	96 1/8
	Siuil,.	84 7/8
	Venice suttell, &c.	129
	Venice grosse, &c.	81 1/2
	Aquila	121 5/8
	Vienne	69 1/2
	Preslaw	104 [illegible]/8
	Liebzig	8 1/4
	Lubec	75 3/8
	Barcellone	111
	Lishborne,	76 1/2
	Geanes,	126 1/8

The agreement of the waighte at Lubecke, with the waight at other places.

Lubecke

100 li. waight at Lubeck do make at

London	115
Andwerpe	110 1/2
Frankford, &c.	101 5/8
Collen, &c.	105
Nuremberg	102 3/4
Rouan	100 5/8
Lions	121 5/8
Parris	150
Diepe	102 7/8
Geneua	92 3/4
Tolouse	126
Rochell	128 1/4
Marcellis	127 1/2
Siuill.	114 5/8
Venice, &c.	171 1/4
Venice, &c.	108 1/8
Aquilla	161 1/2
Vienne	91 3/4
Preslaw	138 1/8
Liebzig	103 7/8
Dantzig	132 5/8
Barcellone	147 1/4
Lishborne	101 5/8
Geanes.	161 1/2

The agreement of the waights at Barcellon, with the waights at other places.

Barcellone.

100 rl. waight at Barcellon make at

London	68
Andwerp	75
Franckford, &c.	68 5/8
Callen.	71 1/4
Nurenberg,	69 3/4
Rouan	68 2/4
Lions	82 1/2
Parris	71 1/4
Diepe	69 3/4
Geneue	62 7/8
Tolouse	85 1/2
Rochel	87
Marcellis	86 1/2
Siuill	76 3/8
Venice, &c.	116 1/4
Venice, &c.	73 1/8
Aquila	109 1/2
Vienne	62 7/8
Preslaw	63 3/4
Liebzig	70 1/2
Dantzicke	90
Lubec	67 3/4
Lishborne	98 5/8
Geanes.	109 1/2

¶ The agreement of the waight at Lishburne with the waights at other places.

Lishburne.

100 li. waight at Lishburn do make at

London	113 1/8
Andwerp	108 3/4
Franckford	100
Collen, &c.	103 1/4
Nuremberg	102 1/8
Rouan	99
Lions	119 5/8
Parris	103 1/4
Diepe	101 1/4
Geneua	91 1/4
Toulouse	124
Rochell	126 1/8
Marsellis	125 1/2
Siuil.	110 3/4
Venice, &c.	168 1/2
Venice, &c.	106 3/8
Aquila	158 3/4
Vienne	90 1/4
Preslaw	135 7/8
Liebzig	102 3/4
Dantzig	130 1/2
Lubeck	98 1/4
Barcellon	144 7/8
Geanes.	158 3/4

The ageement of the waight at Geanes, with the waights at other places.

100 li. waight at Geanes do make at

	Geanes.
London	71 1/4
Andwerpe	68 5/8
Frankford	62 7/8
Collen, &c.	65
Nuremberg	63 5/8
Rouan	62 1/4
Lions	75 1/4
Parris	65
Diepe	63 1/8
Geneua	57 3/8
Tolouse	78
Rochell	79 3/8
Marseillis	79
Siuill	69 3/4
Uenice &c.	106
Uenice, &c.	67
Aquila	100
Uienne	56 3/4
Liebzig	15 3/4
Dantzig	64 1/8
Lubeck	82 1/8
Barcellone	61 7/8
Lishborne	91 1/4
Geanes.	62 7/8

Here followeth the Table of all that is conteyned in this booke.

The Table.

The second part of this booke treateth of fractions or broken numbers.

The thirde part of this booke treateth of all maner of necessarie questions which are vsed in the trade of Marchandise.

The

The Table.

The

FINIS FINIS.

Printed at London by Thomas
Purfoote, dwelling vvithin the
new rents in Newgate
market. 1591.